OUTDOOR PHOTOGRAPHY

BY JULIAN A. DIMOCK

The light had best come from a magnesium cartridge in the hunter's gun

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JULIAN A. DIMOCK

Photographs by the Author

OUTING HANDBOOKS

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CONTENTS

CHAPTER		PAGE
	Introduction — The Thing That Really Matters	11
I.	The Camera	17
II.	Lens and Plates	24
III.	Light and Exposure	34
IV.	Development	42
V.	Prints and Printing	53
VI.	Composition	67
VII.	Landscapes	74
VIII.	Figure Work	83
IX.	Speed Photography	92
X.	Picturing the Leaping Tarpon	103
XI.	Sea Pictures	112
XII.	In the Good Old Winter Time	116
XIII.	Wild Life	124

LIST OF ILLUSTRATIONS

The Light Had Best Come from a Magnesium Cartridge in the Hunter's Gun . . . . *Frontispiece*

FACING PAGE

In Little Italy the Push-Cart Venders Gossip Between Sales 16

Oil-clad Fishers Lustily Hauling Great Baskets of Frozen Fish from the Holds of Their Vessels . . 32

The Photographer May Seek to Tell Some Story of Their Lives 36

Silhouette a Figure Against a Cloudy Sky and Expose for the Sky 44

The Fisherman Must Handle the Fish for the Camera 48

To Impart to Them Motives Akin to Our Own, He Must Enter Into Their Lives 64

I Want My Prints to Show Wild Creatures in Their Native Habitat 68

A Film Exposed in the Frozen North Tells a Story of Cold 76

Accuracy of Timing is as Important as Aim or Speed 80

If You Want the Best the Country Affords, Go to Canada in the Winter Time 96

Underexposing a Plate with a Ray Filter . . . 100

Florida in the Good Old Summer Time 108

Outdoor Photography

INTRODUCTION

THE THING THAT REALLY MATTERS

The thing that really matters is—you.

THE law of chance doesn't seem to work with some people. I know a prominent portrait photographer of the metropolis whose superb technical work I have long admired. It seems impossible that he could avoid getting a certain percentage of artistic results. Yet year after year I have watched his show window and never have I seen a single suggestion of art in any print exhibited.

Not very far from his exhibit of technique is a glass frame, which often contains a single print taken by a woman who is steeped in art. Apparently, she never takes a photograph that is not a picture; at least, she never exhibits such a one. The former has every accessory known

to the profession; the latter, a simple room, plainly furnished. The one never rises above superb examples of merely mechanical photography. The other, with her camera, never falls below works of art that make instant appeal to the eye.

This may seem immaterial, but I assume that your desire is to make pictures, to have your work show individuality and discriminating folk glad to receive gifts of it. To do this, you must pick up crumbs of art as a chicken picks up corn and grubs. There are simple laws of composition which you can practice all day and every day.* You must feel the spirit of the scene on which you look, you must pick out the characteristics and plan how to reproduce them. And all this you can best do as you go about your daily life.

Windows make the best of frames for the study of composition. They inclose the scene and you can, by changing your position, swing a tree from the left to the right side of the picture. You can study its effect in the center of the landscape, in the upper corner, at the lower edge. By moving your head a few inches you can cut off half the branches and have the trunk near the edge of the frame. You can find the

*See chapter on Composition.

vacant places and think how best they may be filled. Would a figure look well in the foreground? In the background? In the middle distance? What proportion of sky and earth do you prefer? Can you handle best one tree, two trees, three trees, or a group? Does the scene need clouds? Do they want to be prominent so as to absorb the interest, or retiring?

Is it a scene in the small mountain country, mere foot-hills? Must you study how to make them look shut-in, cramped? Or is it a view in the Rockies, where a cliff in the foreground is a mile high? Must your picture tell of the big scale of things? How do you produce the effect? Perhaps a figure, even in the near foreground, would be dwarfed, lost. The scale is too big,—yet the effect must be produced. That is a problem to puzzle you, yet it must be solved if you are to make the scene real. Possibly an Indian is stretching out his arms to point the extent of the possessions of his forefathers, perhaps a girl of your own party will show the awe she feels in her face, in her attitude. Perhaps,—oh, perhaps a thousand things, and that is the joy of the problem.

But all this you must feel. It must penetrate to your very soul before you can portray it.

I fear that begins to sound like the mushy

stuff that our long-haired friends write about psychical moments. They have the right idea, only they make a nauseating mess of it. It isn't the state of your moral welfare that has to be considered,—your digestive apparatus has a lot more to do with it. But still, it is very true that there is one scrap of a right moment and a million wrong ones for making an exposure. And because you then have so many things to consider, you must have the groundwork so fixed in your mind that a minimum of attention is paid to it. The fleeting expression of the Indian, the changing attitude of the girl, the scudding cloud that silhouettes his erect figure, the sunlight that glorifies her head as with a halo, these are the ephemeral things that you must be able to recognize and to catch as they appear. But alone they will not satisfy. Your composition must be right.

You must have looked, while you were unpacking your outfit, and decided just where to place the camera; you must have seen just how much earth, how much sky to give the view. You must have seen the source of light, and come to some conclusion concerning its use. Will you work against the sun, will you have the flattening effect of working with it behind you, or will you shift your position so as to get it

at the side? Does the scene need emphasis on the figure, or on the background, or the clouds in the sky? All of these questions, and plenty besides, you must have asked yourself and answered before the camera is set up, for then will come the fleeting things of which we spoke first.

Do you want to picture Fifth Avenue? What do you consider first? What strikes you when you walk there? Is it the magnificent buildings, the stores that are so sure of themselves that they do not have the firm name on the building, the homes of the plutocrats, the stream of vehicles, the gowns of the women, or the sad faces of the people with nothing to do but hunt for amusement? What is it that impresses you? Decide that question before you try to represent Fifth Avenue with your camera. Make the lens look with your eyes, make the plates tell the story that your lips would tell.

Do you want to give your friends a glimpse of Hester Street? Have you been there yourself in winter time, lightly clad and shivering, to understand the blue faces of the hurrying men, women, and children? Have you been there in the summer time, when the heat-soaked pavements scorched your face? Have you wanted to be alone when you wandered through

its streaming masses of humanity and thought what it must be to live always so huddled together? Before you can bring back to your friends pictures that show the throbbing heart of Hester Street you must have entered into its life.

These are the things that count, the elements that will redeem your work from the scrap heap. And you must develop them hour by hour.

In Little Italy the push-cart venders gossip between sales

Chapter I

THE CAMERA

THE pros and cons of camera selection are limitless, and the arguments so nearly balanced that first I shall simply state my own choice. For ten years I have used a 6½ x 8½ Reflex camera for eighty-five per cent of my work and for the other fifteen per cent an ordinary tripod view camera of the folding type,—so ordinary that it has not even the maker's name. The same lens and plate-holders fit both these instruments. In this selection of tools, one object has been sought,—the best practicable results from work done under unknown and widely differing conditions. These cameras have been used in the southern wilderness, under the tropical summer sun, and in the Canadian woods while the mercury was nearly freezing in the bulb. They have been used for flashlighting the interiors of northern logging camps and for flashlights of

a moonshiners' retreat in the Big Cypress Swamp; for indoor portraiture in the metropolis, and broncho busting in the west. And, after this decade of experience, I have no desire to change either.

For the sake of convenience, I shall divide cameras into three classes: The tripod or stand variety, the reflecting camera, and the small, film-using hand instrument. These classes overlap, but are, in the main, distinctive. The percentage of good photographs obtained is likely to be in inverse ratio to the ease of manipulation. Hence this is a factor to bear in mind in your choice of an instrument.

The matter of size is applicable alike to all three classes. Some writers commend the small plate as making an exposure less expensive. To my mind, this is an objectionable feature. If the loss of a plate is of no moment, you will use them promiscuously and will never learn to do better work. Think first and expose the plate afterwards. If additional cost will help you to be thoughtful, pile on the expense,—it will prove a stepping stone to better things. If you are willing to make enlargements from every successful exposure, the small sizes will do, but if, from the negatives, you wish to make direct prints to decorate the walls of the den

or to give away to friends, you must use at least the 5 x 7 or 6½ x 8½. I should put the case this way: For the fun of pressing the button, get a 3¼ x 4¼ or 4 x 5; for the pleasure of getting good results, try a 5 x 7 or a 6½ x 8½.

TRIPOD CAMERA.—For portraiture and carefully composed landscapes, the tripod is essential. A camera cannot be held steadily enough in the hand for an exposure of more than one-tenth of a second, hence for every picture requiring more time than this a secure support is necessary. Indoor work and objects in deep shade out of doors, as well as scenes where depth of focus (or stopping down of the lens) is required, must have more time than this. For photographing the carefully selected landscape, the instrument must be held in a fixed position while the image is studied on the ground glass, and for this the stand outfit is necessary. The tree or the house must occupy a particular spot on the plate, the sky and earth must be accurately proportioned, the swing back should be used to secure sharpness in the foreground. These things cannot all be watched at once; thus, regardless of the length of exposure, the tripod camera must be used.

In selecting such an instrument, the points

to examine are length of bellows, rising and falling front, double swing back, reversible back, and rack and pinion focusing movement. A fuller explanation of the uses of these devices may be found in the chapter on landscapes.

HAND CAMERA.—For convenience in use the small, compact, roll-film hand camera is in a class by itself. "You press the button and the other fellow does the rest," is the acme of simplicity and possesses but three flaws—"you," the "other fellow" and the limitations of the small camera. You cannot see the image on the ground glass and are therefore unable to judge how it looks there;* you do not take time to consider the arrangement of the scene, the different angles of view or the proper exposure. "The other fellow" is developing film by the mile, nearly every inch of which has been exposed without thought or study, and he does not care one little bit how it turns out. The kodak type is undeniably portable, always ready for use, unobtrusive, and it may be quickly reloaded in daylight, while any number of extra films may be easily carried. In expert hands, it is capable of doing good work,

*The ground glass should not be confounded with the finder. The former is the full size of the plate or film and receives the image exactly as it will reach the plate. The latter is merely a sort of sight.

but it needs all of the knowledge of the experienced photographer to make it turn out work of uniform excellence.

REFLECTING CAMERA.—The reflecting camera contains a mirror which throws the image from the lens upon a full-sized ground glass in the top of the box. On this glass the scene before the camera may be watched to the very instant of taking the photograph, and a very fair idea obtained of the way it should look in the print. This permits of accurate focusing, proper placing of the view on the plate, and tells the operator the comparative size of the figures in the foreground and of the objects in the middle distance and background.

To expose a plate, a knob at the front of the box is pressed down by the thumb of one hand. This first throws the mirror up against the ground glass, out of range of the rays of light from the lens, and then releases the curtain of the focal plane shutter,* exposing the sensitive plate. This instrument combines the advantages of permitting careful study of the image on the ground glass with the instant readiness of the hand camera. It is so quick of adjustment that, having heard a fish leap behind me, I

*For a description of focal plane-shutter see chapter on speed work.

have swung completely around and caught a photograph of the creature before it had returned to the water. It is the best all-around camera on the market to-day for serious outdoor photography. Its operation is described at some length in the chapter on speed work. But it has three radical disadvantages: weight, size and cost.

If you wish to get the best photographs that your capabilities will allow, I advise the use of a 6½ x 8½ tripod camera with glass plates. There are two safeguards with this outfit. It takes so long to get the instrument ready for action that you have plenty of time to study the subject and surroundings. The plates are so heavy that you can carry but few, and thus must give each one the best possible chance. The proportions of the print are agreeable and of sufficient size to use without enlargement.

If you wish to do speed work or to take subjects that require a hand instrument, I recommend a reflecting camera of the same size, using plates, and,—if you have the two,—with interchangeable holders and lens. The safeguards are the same as with the tripod camera, while the results are so sure to be uniformly better than those possible with a small instrument that the extra bother is forgotten.

If you want the fun of the thing without the work, and do not take the matter seriously, the easiest instrument to use is the small, roll-film camera.

As to the particular make, I should leave that to the dealers. Go to a responsible house, tell them what you want to do with your camera, and accept their advice.

Chapter II

LENS AND PLATES

THE central feature of the camera is the lens. It pictures the view and transfers it to the sensitive plate. Its adaptation to the work required is of vital importance to the photographer, whether amateur or professional. In complication, the lens ranges from a pinhole in a piece of black paper to an anastigmat, consisting of a scientific combination of numerous simpler lenses, made from the wonderful Jena glass, and its cost varies from nothing to hundreds of dollars.

The lens is subject to as many diseases as the human eye; astigmatism, color blindness, false focusing and general distortion. When your eyes disturb you, you don't study up their physiology and the laws of optics, but you get your oculist to prescribe, and perhaps cause to be ground, the glasses you require for special work. Makers of cameras put specialists on the

job of selecting lenses to fit their own output. Famous manufacturers of lenses spend fortunes in correcting defects, overcoming natural obstacles and adapting their product to every requirement of camera and plate-maker, as well as the demands of photographers from the astronomer to the motion picture man.

VALUE OF F.—There are a few elementary features in the working of a lens that the amateur must understand if he expects ever to get beyond pushing the button and letting the dealer do the rest. First, he must get the F values of his lens in his head if it takes a surgical operation to accomplish it. This F expresses the relation of the focal length of the lens to the aperture which admits the light through it. Thus a wide-open lens, one inch in diameter, having a focal length of eight inches, would be represented by F8. So, too, would a lens two inches in diameter, with a focal length of 16 inches, be represented by F8. In these, as in all other instances, F8 represents a fixed, definite proportion of light on every square inch of ground glass of plate. Thus, when you have learned the proper exposure of plates with one lens of F8, you are primed for all other lenses of the same F value. The focal length of a lens is the distance between it and

the ground glass when it is focused on the horizon. For nearby objects it is necessary to increase this distance by extending the bellows of the camera. This increases the F number of the combination, but this fact is usually ignored in practice.

For the character and quality of lens, the amateur will save time and much confusion of ideas by considering the reputation of the maker and giving weight to the advice of a dealer in whose intelligence and integrity he has confidence. There are many lenses of high repute from which you can make your selection. It is a delight to own one that is fast; and a good one that works at F4.5 is a joy forever. A desirable focus is about twice the short side of the plate used, thus 12 inches for a 6½ x 8½ plate or 8 inches for a 4 x 5. Having found a satisfactory lens, stick to it, excepting where special work demands a change. Experimenting with lenses is profitless work, especially for the amateur.

TELEPHOTO LENS.—In photographing distant objects a telephoto is often a convenience. This lens, as its name indicates, is a combination of long focus lenses, and its purpose is to give the camera telescopic vision without corresponding and cumbersome extension

of bellows. Unfortunately, the combination results in a diffused definition making sharpness impossible, while the multiplication of the F value so increases the time of exposure as practically to limit the use of this lens to tripod work.

It might be hastily inferred that the time of exposure should vary directly with the F numbers. But these numbers vary directly with diameters and focal lengths, while the light admitted through a circular opening varies with the square of its diameter; and a similar law controls in respect to focal length. Therefore, the time of exposure should be proportioned to the square of the F number. Thus, if a lens at F8 called for an exposure of one second, a lens at F16 would require four seconds, that being the relation between the square of eight (64), and the square of sixteen (256), and a lens at F32 would need an exposure of 16 seconds. To make clear the reason for this would require two diagrams and two hundred words that no one would read, so this, too, must be taken on faith. In this writing, F8 has been taken as the unit for comparison with the higher F numbers. Of course, it works similarly with the lower numbers. Thus, a lens at F4.5 would compare in speed with one at F8

inversely as their squares, and the time of exposure with the former would be one-third of that required by the latter.

STOPS.—All lenses are provided with stops for reducing the lens aperture as conditions indicate. As each stop, in proportion to its opening, changes the time of exposure required its F value is usually stamped upon it, which is a mighty comfort to the non-mathematical amateur.

DEPTH OF FOCUS.—The parallel rays from the horizon that fall upon the lens from its center to its circumference are so bent by it that all converge at a point distant from the lens its own focal length. Rays from an object near the lens being refracted at the same angle meet in focus at a greater distance from the lens, hence, for such objects the bellows of the camera must be extended. Rays passing through the exact center of the lens are not refracted in the least and their focus is universal, giving sharpness of detail, whatever the distance of the subject from the camera. But rays passing through the periphery of the lens converge at an angle so acute that they possess substantially no depth of focus, and sharpness is confined to a well-defined plane. Objects before or behind this plane are blurred in propor-

tion to their distance from it. The wide-open lens has the greatest illumination, calling for the least exposure, but has little depth of focus. If the lens is stopped down to a tiny opening, sharpness is universal, but the illumination is so poor that the time of exposure is beyond practicable limits. Distinctness of detail demands a small stop at the expense of illumination and short exposure, while fast work requires a large lens opening at the cost of sharpness in the picture. The photographer must compromise these opposing claims according to the circumstances and his own judgment. Often the amateur estimates his success by the sharpness of his work, while frequently the measure of its merit is the diffusion of focus represented. There is a wide range between the sharp outlines of a steel engraving and the blurred effect of an impressionist's work; but while the former might best present architectural effects, or represent a political convention, where each delegate desired to have his visage preserved for posterity, yet the chance of getting a picture lies nearer the diffused focus of the latter.

The human eye works at a low F number, and has little depth of focus, although this is compensated for by its rapid change of focus.

Thus, the photograph that presents the picture most naturally to the eye shows some prominent feature in good definition and objects before and behind it melting into comparative haziness. It combines a pleasing perspective with the artistic quality called atmosphere.

RAY FILTER.—Although fitted to the lens, the ray filter is really an adjunct to the plate, for it corrects the shortcomings of the sensitive emulsion. It gives color value to the finished negative by repressing the activity of the too actinic blue ray, and stimulating the brilliant but sluggish yellow. From amateur to artist is a long road, with many brambles, but it seems a primrose path to the photographic art student when first he experiments with orthochromatic plates and ray filters. Even the amateur who has lamented that he cannot reproduce the brilliant effects of clouds that he can see soon wonders at the results, more gorgeous than anything he has witnessed in the heavens, from clouds that are almost invisible to the eye.

CONTRAST PLATES.—Plate-makers are many, and their products of high average, with the evil and the good in their nature well balanced. Thus, from one maker comes a plate firm in film and rich in result, defying the heat

of the tropics, and responding to all developers, regardless of warmth of solutions. It is the delight of the neophyte, for the tough film resists rough handling, and the black and white of the negative stand out like the lettering on a street corner, while each feature of the finished print jumps at you like the paint on the cheek of an Indian. For black and white work, where strength is required, these plates are ideal; but the artist who tries one, seeking delicate lights and shades, is likely to have a fit.

HIGH-SPEED PLATES.—At the other extreme is the highly sensitized, soft emulsion, that takes your finger prints if you dare touch it in un-iced water in a warm country. But give it work worthy of its caste, expose it one six-hundredth of a second behind a lens working at F6.3 to the rays reflected from a leaping silver king, from flashing drops and sun-kissed waters, backed by the brilliant blue of the heavens. Look at the plate charily as you develop it, and watch the film swell high with pride, leaving in deep intaglio the higher lights. Study the finished negative, showing each scale as if traced by the graver's tool, each flying drop distinct as a diamond, and the fixed wide-open gills, the play of which no human eye

could have followed. To one accustomed to slow plate methods and results there might seem to be a lack of density and the possibilities of a flat print, but from the trial test the plate comes out triumphant, with the print showing every delicate detail, and the bronzing shadows promise perfect tone and finish.

It is not my purpose to exploit certain makes or makers of lenses or plates. Doubtless there are other lenses and plates quite as good as those I use, but as this book is illustrated by my photographs, it seems proper to inform readers what machinery was employed.

The Voightlander Collinear Series II, No. 6, was used exclusively. It will do better work than I know how to ask of it, and until my knowledge catches up with its capabilities I shall continue to use my old acquaintance.

For plates, I stick to the double-coated Isochromatic Medium and Crown brands of Cramer make. Whenever speed is not the first essential, I use the Isochromatic, and, if conditions permit, an Ideal ray filter with it.

FILMS.—Films are more costly than plates, and have less speed than the fastest. They are less convenient to handle in the dark-room, and are more liable to develop defects. It is uncanny how a spoiled spot in a film will an-

Oil-clad fishers lustily hauling great baskets of frozen fish from the holds of their vessels

ticipate the vital point in a view to be taken, and locate in that exact place a month in advance. But films are extraordinarily convenient in the field because of their lightness and portability.

A fresh spool of unexposed film may be substituted in full daylight for one that has been exposed, and any number of them may be carried in the pocket. Yet I have packed hundreds of pounds of plates on broncos when streams were to be forded or swum, and mountains climbed, and carried them in canoes where portages were many, and on sledges, where mercury freezes. I have changed plates in a mangrove swamp, with tent and blankets piled over me to shut out light and air, while they kept in mosquitoes and deadly heat. Yet I would do it all over again rather than ever carry another film. The consensus of opinion is against me. Films have come to stay, and who am I that I should kick against the pricks?

Chapter III

LIGHT AND EXPOSURE

LIGHT does the work on the sensitive plate, and requires a definite time to accomplish it, but if given too much it spoils the picture it has made.

The time of exposure is the biggest problem presented to the photographer. For the kodak amateur it is solved mechanically, usually within a thousand per cent of accuracy; but the student who means to make pictures ought to hit the correct time within a hundred per cent. And really, that would be fair for an expert.

I once officiated at the post-mortem of a lot of plates which a relative had exposed in Bermuda. He had given four seconds' exposure, with a wide-open lens, under circumstances that called for the three-thousandth part of that time. The condition of the plates reminded me of a box of negatives that I sent from Florida

to my home, with the injunction to put them in a cool, dry place, that the plates might not spoil. At the same time I shipped, without comment, another box containing the hide of a crocodile intended for mounting. Later I received word from home that the boxes had arrived, but that the plates must have spoiled already, for they smelt awfully.

LENGTH OF EXPOSURE.—So many varying factors affect the time of exposure that it requires six tables to present them in available form. Between a cloudless sky and one heavily overcast, the times of exposure required are as one to four. Noon of June compares similarly with 3 P.M. of December. An outdoor portrait demands an exposure sixteen times greater than a picture of sky and clouds, the depth of a forest or a dark ravine fifty times greater, and an interior view from one thousand to ten thousand times longer exposure. The fast plates most used by the amateur compare in sensitiveness as one to two, and the F value of lenses within the ordinary work, from F8 to F32, call for exposures differing as from one to sixteen.

Under the most favorable conditions named, bright sunlight (as midday in summer), with clouds for a subject, the most sensitive of plates

and a wide-open lens, the exposure required would be about 1/800 second. Compare this with the less favorable, but not unusual, conditions of photographing a friend on a cloudy November afternoon, with a lens stopped down to F32, and an ordinary fast plate. The time of exposure must be multiplied by 4 for the clouds (Table I), by 4 for the season of the year and hour of the day (Table II), by 16 for the subject (Table III), by 16 for the stop (Table IV), and by 2 for the plate (Table V). The result is 8192, with which to multiply 1/800 second, giving 10 seconds as the time of exposure.

Suppose you are picturing an open lawn, with a group of children in the middle distance, at 4 P.M., on a clear summer day, with the lens at F11. Multiply time of exposure by 8 for an average landscape (Table III), by 2 for the hour (Table II), by 2 for the stop (Table IV), and set the shutter of your camera to give 1/25 second exposure. If the children begin to play tag before you have exposed the plate, you will take out the stop, leaving the lens wide open, or at F8, which will reduce the time required to 1/50 second. But when children play tag it requires a speed of 1/100 second to catch them (Table VI), so you set your shutter at that

The photographer may seek to tell some story of their lives

figure, trusting to the developer to make good with the picture, for a hundred per cent latitude in exposure is only a reasonable allowance.

ACTINIC VALUE.—The eye is incapable of judging, within a reasonable percentage of the truth, the actinic value of light. The yellow ray which seems bright to the retina affects the sensitive plate but slightly, while photographs can be taken by the dark actinic rays that lie beyond the violet in the spectrum. A better measure of the actinic value of light than the tables can give is to be found in the—

ACTINOMETER.—In this instrument a strip of sensitive paper is darkened to match a given shade, and the time noted. In the sunlight of midday in June this requires about two seconds. The relation between these two periods of time establishes the character and quantity of light, eliminating the uncertainties of Tables I and II, leaving only Tables III, IV and V to be considered; and of these, only Table III, relating to the object to be photographed, calls for more than a moment's thought, while some actinometers are arranged to perform automatically the mathematical stunts.

TABLES.—Exposure tables are published giving much more detailed information than

those appended, but when two out of five factors can only be guessed at it seems hardly worth while to push minutia to a confusing extent in analyzing combinations. I have given as many details in the tables as I think will be read, and more than I ever used myself, and have written in round numbers, seeking only to approximate results as nearly as seems sensible. There are lesser factors than those treated of, which complicate results, but to tabulate their importance would confuse the amateur as much as it would muddle me.

TABLE I

LIGHT—RELATIVE TIME OF EXPOSURE

Intense sunlight	1 second
Faint shadows	2 seconds
Dull	3 seconds
Very dull	4 seconds

TABLE II

SEASON OF THE YEAR AND HOUR OF THE DAY

Midsummer at noon	1 second
Midsummer at 8 A.M. or 4 P.M.	2 seconds
Midwinter at noon	2 seconds
Midwinter at 9 A.M. or 3 P.M.	4 seconds

TABLE III

SUBJECT	
Sky and clouds	1 second
Sea and snow scenes	2 seconds
Landscapes, open	4 seconds
Landscapes, average	8 seconds
Portraits, near	16 seconds
Ravines or dense woods	50 seconds

The use of this table calls for good judgment, which practice and careful study will rapidly develop. Extreme conditions have not been considered in the table. For example, in the clear air of a snow-capped mountain, with its dazzling sunlight and brilliant reflections, or on the white sand of a wave-washed beach, beneath a tropical sun, the shortest of the exposures of the table might have to be divided by two or more, while what seemed an ordinary interior view might require that it be multiplied by from 1,000 to 10,000.

The greater the distance from the camera of the object to be photographed, the shorter is the time of exposure required. When the subject is very near the camera, the increase of exposure required becomes important.

POSITION OF SUN.—The position of the sun, relative to the camera, may seriously modify the required time of exposure. If its light

comes from behind the camera, the time of exposure must be cut down, often by as much as one-half. This is partly because of the full illumination of a scene so pictured, and partly because the resulting flatness of such illumination can only be redeemed by an underexposure, which, through the contrast occurring in development, gives life to the negative. If the sunlight comes from one side, unless the shadows are very deep the exposure should be normal. If, however, the camera is pointed at the sun, the illumination is so poor, and the contrasts so great, that often the time of exposure should be doubled, or even quadrupled.

TABLE IV

STOPS

F8	1 second
F11	2 seconds
F16	4 seconds
F22	8 seconds
F32	16 seconds

TABLE V

PLATES

Fastest plates of standard make	1 second
Fast plates, orthochromatic, etc.	2 seconds

Comparative speed of slower plates made for special work may be obtained from makers, catalogues, or exposure leaflets.

Objects in motion call for a table giving approximate speed required for satisfactory sharpness. The figures given are based on an attempt to average conditions which may vary widely. Lenses may change them as 4 to 1, and distance affect them yet more radically. This subject is treated again in Chapter IX, under speed photography.

TABLE VI

OBJECTS IN MOTION

Animals grazing, street scenes.....	1/50 second
Children and animals at play.....	1/100 second
Hurdling, motor boat, running horse.....	1/300 second
Flying birds, leaping fish, automobiles.....	1/600 second

No lens has been made, and no conditions exist, that would give full exposures at these speeds. Yet the high speed is of such vital importance that it is better to maintain it, and leave to development the task of bringing the most possible out of the underexposed plate.

Chapter IV

DEVELOPMENT

WHEN Daguerre first captured a sun-painted picture, by subjecting an exposed plate to the vapor of mercury, it was doubtless accounted a bit of black art in which the winged god figured. From that day to this, development of photographic plates has been treated as an incantation. The instant high lights appeared, spells were woven. A restraining potion of bromide soothed the nerves of the image, a dash of alkali brought out its hidden details, and a swift change of developer comforted the photographer with the idea that he was doing something.

After the developer has been prepared, the process of development is like baking a cake, which isn't improved by frequent examination, changing of ovens, or much fooling with the heat. It is only an expert who can judge by the appearance of a negative in the tray, or by

transmitted light in the dark-room, when its development has gone far enough—and *he* is usually mistaken.

FACTORIAL SYSTEM.—A method much in vogue is the so-called factorial development, in which the plate is placed in the developer and the time noted until the high lights begin to appear. The seconds or minutes are multiplied by the constant assigned to the developer used, which varies from 5 for hydroquinone to 40 for rodinal, and the plate is left in the developer for that period of time. Thus, if the developer were rodinal, and the first high lights appeared in 30 seconds, the plate would be left in the solution for 20 minutes. If an orthochromatic plate, especially, were watched in the dark-room till the high light could be seen, it would thereafter make little difference how long the plate was developed, or whether it was developed at all, for the first few seconds' exposure to even the dim light of the dark-room would ruin the plate. This is of little importance to the amateur, for he won't try the method but once, and the expert is unlikely to try it at all.

RULE-OF-THUMB METHODS. — Development is so far from being an exact science that its rule-of-thumb methods horrify chemists

and fill volumes with formulas combining essentially the same ingredients, in proportions that vary without rhyme or reason. Weights of chemicals are given in odd grains in cases where misreading ounces for drams wouldn't make an observable difference in results. I have analyzed scores of these tables, classifying and averaging ingredients, and testing results, without feeling that I had advanced my knowledge of the subject one iota.

In my first developer, pyro was the active agent, and I used pyro formulas for years. I had an individual struggle with each plate, rushing the pyro when I thought I wanted density, and pushing the alkali to bring out elusive details. Sometimes the process was carried so far as to destroy the film. I cannot to-day think without a pang of my development of a negative which I had exposed on a big bull elk after half a day's climbing and crawling to approach him. The underexposed plate developed slowly, with the details of the elk distinct but faint. When carbonate of soda failed to bring out more detail I added a solution of caustic potash, which accomplished my object. Then slowly the film began to shrivel, and when the plate had been fixed and dried my beautiful wapiti was a piece of coarsely constructed mo-

Silhouette a figure against a cloudy sky and expose for the sky. The spectacular features will more than compensate for the lack of detail in the shadows

saic. Pyro was so given to fogging plates that when first I tried hydroquinone, and looked upon its clean work, its clear shadows and strong high lights, I put away upon the top shelf of my dark-room my stock of pyro.

I tired of the too great brilliancy of hydroquinone, with its lack of softness and detail, and alternated its use with eikonogen, which was then just coming to the front. Although it gave excellent detail, the latter lacked the strength of which the former had too much. Often the best effect was obtained by combining them. My next experiment was with metol, which fascinated by the quickness with which it made the image flash out, but was disappointing in its lack of strength, so it joined the row of discards on the top shelf.

Rodinal is a lazy man's developer, for it only requires the addition of water, ten parts of which give strong contrasts, while a larger quantity gives proportional softness. One trial of edinol sent rodinal to join its predecessors, and for a long time I revelled in the faith that I was making better negatives than ever before. Later I discovered their one defect. The prints made from them were as flat as the plates were spicy. Lastly, I tried a pyro formula recommended by the makers of the plates I was using.

It gave me poor negatives, but they printed wonderfully. The picture on the plate was a mere shadow, without strength for the high lights or material for the details, but the prints were rich in both.

The lesson of the experiment, of all the experiments, is that it is a waste of time for the photographer, whether professional or amateur, to wander far afield in pursuit of new developers. The great plate-making companies, with their staffs of experts, the stimulus of rivalry, the pressure of appeals, complaints and suggestions from thousands of customers, and the knowledge that their prosperity depends upon the success of their customers with developers, may be relied upon to work out the formulas best adapted to their own brands of plates and emulsions. They give instructions and formulas for the development of their plates to meet the idiosyncrasies of their customers, from the novice who wants brilliancy, to the lantern-slide maker who demands detail, and the artist who must combine the two. I write to the makers of my plates once a year, asking them if there is anything new I should try. If they suggest something with a reasonable sound, or that they recommend very highly, I experiment a little with it, but otherwise con-

tinue on the even tenor of my way, using the same old solutions in the same old way.

It is hard to understand that brains don't count in development, and the amateur will continue for a time to stand over his plates, ready to make quick addition of restrainer or accelerator if the image fails to appear in proper fashion. He will have rows of different developers at hand, from the quick-as-a-wink variety to the slow, density-giving species. After he has spoiled a lot of plates and wasted much nervous energy, he will put his judgment in his pocket, carry out instructions to the letter, and finally follow me to that lower plane of intelligence where negatives are developed mechanically in tanks. The road that I traveled to reach the tank was long and thorny, and I have written so much in detail hoping to shorten it to the reader, for it is the path he will eventually pursue.

In my own work I have adopted the pyro-acetone formula accompanying each box of the Cramer plates, using 60 grains of pyro to 85 ounces of water at a temperature of 65 degrees. This calls for 45 minutes in the solution. If the plates are known to be underexposed, I extend the time to 50, or, in rare cases, to 60 minutes. I put the plates in the rack in com-

plete darkness, and immerse it in the tank, which has been previously filled with the solution. In about 20 minutes the rack must be taken out and turned upside down, or there will be streaks on the negatives. If you have a reversible tank you turn the whole thing over, but mine is not of that kind. I had special racks made, with the plate entrance from the side, which can be turned upside down without spilling the plates. The old style can be made serviceable by tying a string around the plates and rack, which will keep the plates in place, and give practical service.

At the end of forty-five or fifty minutes the solution is poured out of the tank, which is then placed under a tap of running water for about five minutes. Plates and rack are now lifted from this tank into another filled with the hypo. solution. After fixing thoroughly, rack and plates are transferred to running water, and left for an hour. Thus, from the time the undeveloped plates are placed in the rack until they are put up to dry, they are handled only in the racks, in units of six. This method of working saves much time, besides safeguarding the plates.

TANK DEVELOPMENT.—Tank development proceeds with plates vertically placed,

The fisherman must handle the fish for the camera, but the direction of the light and the proper instant of exposure are matters for the photographer to manage

permitting long development with weak solutions without injury from sediment. The same quantity of developer is required for each six plates, but in the tank each plate starts with a fresh solution, and all receive equal treatment, while in the trays they are treated tandem, and no two are developed alike.

AFTER TREATMENT.—If there is doubt about the sufficiency of the exposure, it is better to develop for underexposure, since overdevelopment is easily corrected. Reduction by Farmer's solution will remove the density without changing values while the persulphate solution cuts down contrast in the negative, often giving you reason to rejoice in the overdevelopment. Intensification is seldom satisfactory, and your comfort in a case of underexposure is the knowledge that tank development has done all for the plate that was possible in the present state of the art. Before reducing or intensifying a negative it is well to make a print from it, for many unexpected effects are produced by over thin or extra thick plates, and it is well to see the finished picture before changing conditions. Plates exposed in summer in Florida, in winter in Canada, in city streets and studios, and in rocky gorges receive the same treatment with only negligible modifi-

cations. I have said that the variation of time of development between over and underexposure was from forty to fifty minutes.

VARYING TEMPERATURES. — The range of temperature is even less. In summer, the outside heat will slowly raise that of the solution, so I begin with it a little below 65; while in winter I start with it a little higher. Whenever practicable, I put off the development of plates until my return to my workroom, in the mountains. Here, winter and summer, spring water flows at a temperature of 46 in any volume required. Quality and temperature are wonderfully adapted to photographic work. Often, solutions of mixed developers keep clear and ready for use through an entire calendar year.

But the same formula and the same tank are used under conditions that are different. I have spent summers in Florida on a small houseboat, outside of the zone of ice, and almost beyond that of fresh water. Exposed plates were piled high, and when fortune favored us with a cake of ice I retired to the tiny dark-room, where, for many, many hours, I sweltered. Blankets were kept on the cabin roof, and water thrown over them every half hour. The tank was swathed in a blanket that had been dipped in

ice water, while bits of ice were constantly added to the solution in the tank. Instead of a real wash between developing and fixing, the plates received a couple of rinsings. The hypo. bath was kept iced, and fresh hypo. continually added, that the dissolving chemical might aid in keeping the solution cool. Washing the plates consisted in soaking them in three changes of ice water. Drying the plate was tedious, and if a fly walked across it during the process, his feet sank through the film to the glass, marking his trail by a series of holes the size of a pin.

FORMULA FOR TANK DEVELOPMENT

Pyro	60 grains
Sulphite soda	200 grains
Oxalic acid	1½ minims
Liquid acetone	¾ ounce
Water	85 ounces

At a temperature of 65° Fahr. develop plates for 45 minutes.

FORMULA FOR TRAY DEVELOPMENT

Edinol	36 grains
Hydroquinone	5 grains
Sulphite soda (anhydrous)	24 grains
Acetone-sulphite	15 grains
Potas. carbonate (anhydrous)	120 grains
Water	16 ounces

FORMULA FOR FIXING BATH

Hyposulphite of soda	1 ounce
Water	4 ounces

FORMULA FOR FARMER'S REDUCER

Hyposulphite of soda	1 ounce
Red prussiate potash	60 grains
Water	16 ounces

Mix just before using and keep in subdued daylight.

FORMULA FOR PERSULPHATE REDUCER

Persulphate of ammonium	240 grains
Water	16 ounces

When the intensity is sufficiently reduced, rinse immediately and immerse the negative in solution of sulphite of soda, one part to ten of water. Then wash and dry.

Chapter V

PRINTS AND PRINTING

I HAVE experimented with printing methods by the dozen, from salting and sensitizing plain paper to working with carbon tissue; from electrotyping intaglio effects of film to etching photographic pictures on glass with hydrofluoric acid vapor, and I shall earn the gratitude of the reader, even though he may never know it, by sparing him the recital of my troubles, for triumphs were few. Even of the recognized and useful processes, from the practical blue-print to the artistic gum-bichromate, a full description would require volumes, and exhaust my information in its early stages. I shall limit this chapter to a consideration of five typical methods, representative of processes in general use which I believe merit the study of the amateur.

SOLIO.—Gelatino-chloride paper, of which Solio is a good example, gives prints that are

accounted less artistic than those obtained by the platinum process, and that can bear no comparison with the effects secured through the proper use of carbon tissue, but their pleasing contrasts, depth of shadows, and clearness of detail lend themselves to reproduction and enlargement, and they are in universal demand for magazine use. Solio is a printing-out paper, in which the full strength is brought out in the printing frame by exposure to light of the sun, direct or diffused. The negative is placed in the frame, face up, in the usual way, a sheet of the sensitized paper laid face down upon it, and the hinged back fastened in its place. The frame is now placed in the sun, with the planes of the negative at right angles to its rays. Little adjustable frames to hold it in place can be cheaply bought or manufactured at home.

PRINTING SOLIO.—As the printing proceeds, the frame is occasionally taken into a well-shaded corner, one side of the hinged back opened, and the turned-up paper examined for an instant. When the paper is a few shades darker than is desired in the finished print it should be removed from the frame and placed in a light-tight box. Both before and after printing, the sensitive paper should be kept in

the dark, and the necessary handling performed in as dim a light as practicable.

Often a print can be improved by shading from the bright sunlight some part that would otherwise print too far. This can be done with a piece of cardboard, which must be kept in constant motion, or lines will show that will spoil the print. The first few prints you experiment with in this way will be spoiled anyhow, but in the end you will find the method a valuable adjunct to your work. It is almost universally recommended to print weak negatives by diffused light, and even through a few thicknesses of tissue paper. The value of this practice seems to me to have been overestimated, and it is long since I have bothered with it.

TONING SOLIO.—After printing, the prints must be toned, fixed and finished, but this can be done at convenience, as they deteriorate very slowly if kept in darkness. Toning is very important, and there are many methods and formulas, but none better or simpler than the one I append. One who experiments with toning baths is likely to come to grief. Many years ago I tried the then novel combined toning and fixing bath. Never were tones so lovely, so easily obtained. Never, too, were objects as ugly as the prints thus toned, after a few years

had passed. I have books of prints so treated which I keep as horrible examples. It is probable that toning by such a combined bath is sulphur, instead of gold, toning.

My treatment of gelatino-chloride paper after printing has for years been as follows:

WASH 15 minutes in a tray of running water, keeping the prints moving.

TONE in bath made as follows:

Gold stock solution	¾ ounce
Borax stock solution	1½ ounces
Water, at 60 degrees	45 ounces

This quantity is sufficient to tone 24 6½ x 8½ prints. The stock gold solution consists of 15 grains chloride of gold dissolved in 7½ ounces of water. The stock borax solution consists of ½ ounce of borax in 12 ounces of water.

Tone until the red in the prints changes to brown, or prints begin to lose detail. With paper that is fresh this takes about 4 minutes. With paper 1 month old it needs about 7 minutes, while four months' old paper requires nearly 12 minutes. Some lots of paper tone more slowly, but the above relation continues to obtain. It is my observation that the older paper, although taking longer to tone, gives

richer results, and is less weakened in the fixing bath. The most important step in toning is taken when the sensitive plate is exposed in the camera. The particles of gold in the toning bath eagerly hunt their respective places in a print made from a properly exposed, fairly developed negative. They build up into masses of warm browns and royal purples in the deeper shadows of the picture, contrasting richly with the brilliancy of its high lights. Often an under or overexposed negative will make a fair showing in a print until the acid test of toning is applied. Then the atoms of gold are as hard to herd as a drove of pigs, and smear the print with faded blues and yellowish browns. I tone in a tray slightly larger than the prints, putting in 24 at a time. They are added to the solution in pairs, back to back, and when all are in the solution the lowest pair can be slipped out, turned over, and laid on top. This is continued without cessation until the prints are toned. In this way the prints are presented consecutively to the eye and the color may be noted. After a little experience one can tone by the watch, enabling him to work by lamplight, but the method of manipulation should be the same and the motion of the prints in the solution not intermitted.

WASH, after toning, for about five minutes.
FIX 15 minutes in bath, as follows:

Hyposulphite soda stock solution.....	3½ ounces
Water.....	35 ounces

Stock solution of hypo. made by dissolving 1 pound hypo. in 32 ounces of water.

WASH one hour, in running water, if possible, otherwise in 12 changes of water.

SQUEEGEE.—As prints are taken from the wash water lay them face down on squeegee plates, and go over them lightly with a flat squeegee to remove air bells. Lay a clean towel on them, and finish with a roller squeegee. Stand them on a shelf to dry, after which they will peel easily from the plate, and show all the finish of the polished plate itself.

TRIMMING.—The artistic value of every print can be increased by proper trimming, but in that respect the amateur must work out his own salvation.

MOUNTING.—In mounting these prints, thick paste should be used, applying as little as possible, around the extreme edge of the print, that its surface may retain its brilliancy.

PLATINUM PRINTS.—Platinum prints are capable of producing artistic effects soft and gray, sometimes shading to nearly black. The

paper is more expensive than that used in other processes; it develops very rapidly, but it is difficult to get the printing exactly right. The developer is best bought ready-made of the dealer, and instructions that come with the paper should be closely followed. The process is about as follows: Print till the image is faintly outlined on the paper. This will take about one-third of the time required to complete the printing of the usual varieties of printing-out papers.

Develop by immersing in, or floating on, a solution of one part oxalate of potash to 6 or 8 parts of water for a few seconds. The temperature of this bath should be about 70 degrees. Fix the prints by immersion for 5 minutes in a bath of one part chemically pure hydrochloric acid to 60 parts of water. Repeat this twice with fresh baths.

BROMIDE PAPER.—Bromide paper gives results similar to platinum and is the only paper sensitive enough for enlargements. It is made with glossy, matte or rough surfaces, and is capable of giving a variety of tones through development, for which the makers give instructions and formulas. Any clear-working plate developer, diluted to about half strength, can be used.

Expose the paper beneath the negative, in the printing frame, to any artificial light, from electric to candle. The exposure may vary from a few seconds to many minutes. By printing from the same light at a uniform distance, the proper time of exposure for a given negative can be quickly learned. The exposure produces no visible image, but the print is developed, rinsed, fixed, washed and dried, like a negative plate or film. A good formula for a developer is:

Amidol	24 grains
Bromide of potassium	12 grains
Sulphite of soda	120 grains
Acid bisulphite	½ ounce
Water	10 ounces

FIXING BATH

Hyposulphite soda	4 ounces
Bisulphite of soda	1 ounce
Water	20 ounces

VELOX PAPER.—Of the so-called gaslight papers, or those requiring development, Velox is the best known and most widely used by amateurs. Its treatment is the same as bromide paper, excepting that the exposure must be longer, and the developer should be of the strength of those used with sensitive plates, or

about twice that of those that work best with bromide paper.

CARBON PRINTING.—Carbon printing, more than any one process in photography, initiates the camera user into the higher realms of the art. A good carbon print is the most artistic one that can be made from a suitable negative, and a negative that will not print well in carbon had best be thrown away. The carbon print is the court of last resort, and no appeal is possible.

Platinum, Solio, Velox, each does better with a certain character of negative, and just so long as you use any of these you will excuse the poor result by thinking that the plate is "not adapted" to that kind of print. When you have become proficient in carbon printing, and cannot get a good print from your negative, blame yourself, and set about learning how to make plates that will give you satisfactory results. Therefore, learn to make carbon prints. If anybody tells you that they are easy to make, throw a brick at him, for he is a deceiver. The process needs treatment at length, so acquire some book on the subject, for but few words can be given to it here.

CARBON TISSUE.—Fine particles of coloring matter, such as lampblack, are held in

place by a gelatine film. This film is soaked in a solution of bichromate of potash and dried in the dark. Upon exposure to light the film becomes insoluble in water. Exposed under a negative, the parts of the tissue under the bare glass are made insoluble, the parts under the opaque sections of the negative remain soluble, and the intermediate tints more or less soluble. Thus, after having exposed the piece of carbon tissue (the technical name of the film) under a negative, if it is placed in water the insoluble parts remain black, the soluble parts will wash entirely away, leaving white paper, and between these two extremes will be the complete range of tints from white to black.

By varying the strength of the bichromate solution softness or strength may be had in the print. By transferring the carbon to tissue paper the softness of that material may be availed of; by changing it to rough drawing paper the sketchy effect may be had; by making the print on porcelain or opal glass, the translucent softness of that substance may add to the charm of the print. This use of many materials is possible because of the one real trouble in carbon printing: After exposure to light the carbon tissue must be transferred to some support other than the paper on which it comes to

you; for to retain the delicate details, the soluble particles must be dissolved from the back of the tissue.

Another bugaboo is really an advantage. The action of light on the tissue is not apparent to the eye, hence some form of actinometer must be used. Frequently I use this for making prints on Solio paper, for it is really more convenient than the continual examination of prints necessary without it. A tissue sensitized in a 3 per cent solution of bichromate needs one-half the time of exposure that a Solio print requires to reach the shade desired in the finished product. An actinometer is easily and cheaply made but we will here work without it, using a watch instead. The support to which we transfer the print is coated with a solution of gelatine and alum, and hung up to dry.

The tissue does not keep well after its immersion in the sensitizing bath, so that had best be done one or two days before using, and it must be dried just quickly enough. Too rapid drying makes the tissue brittle to handle; too slow drying makes it insoluble and clogs up the high lights; about six hours is the proper time. A "safety edge" must be put around the negative, so that the edge of the tissue does not print at all, else the print will be liable to tear when

we remove the backing or paper on which it comes.

PRINTING.—Our sensitive tissue having been properly sensitized and dried, awaits us in the dark-room. We put a little strip of Solio paper under the negative in the printing frame, and find that it takes five minutes to reach the shade desired. Then we place the safety edge on the plate, and over that the carbon tissue. After leaving the frame out in the sun for 2½ minutes we bring it to the dark-room. In a large tray we have soaked a piece of "support," as the substance to which we shall transfer the tissue is called, until it is thoroughly limp. In this same water we put the exposed piece of tissue, being careful to submerge it entirely and to free it from air bells. As soon as it is limp we draw tissue and support from the water, place both on a pile of blotters, and vigorously and thoroughly go over them with a flat rubber squeegee until water and air bells are squeezed out. It is well to protect the tissue during this operation by a piece of light rubber cloth.

Then we place two or three thicknesses of blotter over the print, a board or piece of heavy glass over them, and a weight on top of this. After twenty minutes or so the tissue and support, sticking fast together, are submerged in a

To impart to them motives akin to our own he must enter into their lives

tray of water, at a temperature of 100 degrees Fahrenheit. After a few moments the particles of carbon will begin to ooze from under the edge of the paper backing of the tissue. When this has gone just far enough it must be lifted by one corner and very gently pulled away. This is the critical point of the whole proceeding, and the one most likely to cause failure. We have left a soft, sticky mass of black carbon. By prolonged soaking in the water and gentle rocking of the tray this will wash away until we have left a carbon print.

After all soluble matter is removed the print is washed for a few moments in fresh water and then "fixed"—*i.e.,* rendered insoluble—in a bath of alum. It is then washed for a few moments, hung up to dry, and is ready for mounting. If water of 100 degrees does not soak away enough of the carbon, it may be heated to a slightly higher temperature; 110 is the limit of safety, although sometimes we can go much higher.

I have spoken here of only the "single transfer" process, which will give a reversed print; that is, one as seen in a looking-glass. If it is desirable to have the right hand appear as the right hand, a double transfer is necessary. This is accomplished by developing the tissue on a

"temporary support," from which it is again transferred when the first process is completed. Carbon printing is not as complicated as this account may sound, and the aspirant for the higher ranks of photography should learn to make them.

Chapter VI

COMPOSITION

THE preceding chapters on the technical side of photography have been necessary, but had best be forgotten now that you have the essentials. There are experts in every branch ready to help you for the asking. Any dealer will advise you in the selection of a camera. These instruments are often already provided with lenses which have been carefully chosen by the makers of the cameras. The dealer will further advise, the manufacturer of the camera will gladly help, or the editor of your photographic magazine will supply you with any aid in his power. Any good brand of plates will do—ask the dealer's opinion.

For developer use one of the formulas accompanying each box of them. These are made up by experts especially for that particular brand of plate. If the plates don't work right, take your troubles to the dealer, the editor or

the manufacturer—they are ready to help. Ask any friend who is a photographer himself, and you won't be able to break away from him if you show a real interest in the subject. But don't begin by asking anybody to admire your early efforts. They are merely stepping-stones. If you really think that they are extraordinary pictures, send them to some exhibition and see what happens. That's the way I learned my first lesson and got my start on the road to improvement. It is a most effective method. But don't decide that the trouble is with plates, formulas or apparatus. Having selected certain brands, stick to them, and don't change. The fault is with you, and you will be longer in discovering it if you change makes.

RULES.—It is with your excursion into the field of artistic composition that real interest begins, for henceforth you travel the way that is individual. No dealer, no manufacturer, can direct you in that journey; you must help yourself. Develop your powers of observation and appreciation. There are rules of composition which you must learn so thoroughly that you apply them automatically. Remember that while a master may successfully break rules it is folly for the beginner to attempt it.

If the scene is a broad expanse of open view,

I want my prints to show wild creatures in their native habitat, yet to be pictures rather than natural history studies

a good general rule is to put the horizon about one-third from the bottom. If the foreground is the point of interest, put it one-third from the top of the plate.

Never get the horizon line exactly in the center of the plate.

If a road or a river runs down the middle of the scene, move your camera to one side so that the lines will cross the plate at an angle.

Never allow the lines to run up the middle of the picture.

Do not crowd your plate. One figure is better than six, the trunk of a tree better worth a picture than a forest.

Place the tree or the figure about two-fifths from the right or left hand side of the picture. The principal object is not always obvious, and it can be emphasized by getting the lines of the picture to converge on it, thus drawing the eyes of the spectator to it.

Never place the principal object of interest in the center of the print.

Repetition is useful for adding strength. Thus, if a tree is the object of interest, it can be emphasized by other trees following the same lines, but fainter and less distinct as they disappear in the distance, and by this very quality calling attention to the one that stands out.

When you pick up a magazine analyze the illustrations that appeal to you, and see how the artist has composed his picture. Note the poses of actors on the stage, and see how carefully studied is the balance always maintained.

Composition is defined as "the practice of so combining the different parts of a work of art as to produce a harmonious whole." The elements must fit together, they must be in harmony and balance one another. The beggar must not be in fashionable garments, nor the society girl in rustic clothes. The ladder must lean against something, and the toppling building be propped up with a heavy piece of timber. Unconsciously the eye demands the supporting beam under the building. Without it the mind is not at rest, for that fear of falling is present. This illustration must not be taken literally, but it serves to convey the idea.

EXAMPLE.—I have in mind a picture of some horses hauling a heavy load across the soft sand of a beach. They are powerful beasts, with shaggy manes and long tails. They fit the surroundings. The harness is the kind that such horses, doing such work, would wear. The driver, in figure and dress, belongs to the scene. Thus we have harmony. The effect of effort is conveyed by the attitude of the horses.

Harnessed in tandem, each beast is struggling forward, straining against its collar. The driver, too, leans forward, whip in hand, as he urges the team to better efforts. This conveys the idea of intense struggle, but, left alone, would leave you with that sense of falling which you would feel with the unsupported building. To correct this trouble the artist makes use of deep ruts in the nearby foreground. These run across the picture at such an angle as to produce the effect of the beam wedged in under the leaning shed, thus supplying the balance to the picture as a whole. To make these lines a little clearer to you: The horses are traveling from right to left, leaning ahead. The ruts run from left to right, ascending from the lower left-hand corner of the picture, so as to form an angle of approximately ninety degrees with the leaning horses.

CHIAROSCURO.—Besides balance of line, the subject of composition takes into account masses of light and shade. *Chiaroscuro* it is called. To realize how important is this feature, think of some of the dabs of India ink in Chinese decorations. Why are they effective? You will do well to study any examples within reach, for the proper proportioning and placing of these masses will make a picture.

A geometrical design is not art, else we would reduce the subject to a science. Two lines drawn across a sheet of paper, dividing it into four equal parts, make a geometrical figure, but not an artistic design. Shading one, two or three of these equal parts does not make a picture; but two lines can be drawn across a sheet of paper so as to make a pleasing division of that expanse of unbroken white, and shading one, two, or three of them gives masses of light and shadow that are distinctly attractive. Try this with a pad and pencil; it will help you with your next landscape photograph.

The photograph taken with your camera may please (1) by representing Nature, (2) as a design with attractive arrangement of line and mass without regard to its subject, or (3), by telling a story. But to be a picture, it must to some extent fulfil all these requirements. It must at once be natural, decorative, and convey a sentiment.

The only rule for success is that of continual study. Strive to improve by looking at examples from the best artists and by everlasting observation of the beauties around you. Before going afield you will do well to visit some art gallery. Study good pictures, and note their simplicity, their charm of homely human inter-

est, their scant material. Then work out your own salvation. Remember that a good composition is one that creates a feeling of satisfaction, of completeness, and conveys the best sentiment of the subject portrayed.

Chapter VII

LANDSCAPES

CAMERA.—The stand camera is adapted to landscape work. It has various contrivances to assist the photographer, either to overcome natural difficulties or to assist him in making use of the idiosyncrasies of his tools. The hand camera is, at least, a makeshift for this branch of photography. It does good work in the hands of an expert, and even the tyro has occasional success with it, but the beginner would get better results, and get them oftener, if he confined himself to the less convenient tripod camera. The expert has learned by experience the limitations of the hand instrument, and he uses it in such ways as to minimize these restrictions while emphasizing the good points of catching action, spirit and unstudied poses, to which it is especially adapted. All general rules are applicable to the hand as well as the tripod camera, so it is the use of the latter to which we shall confine this chapter.

BELLOWS.—The camera should have ample length of bellows, and these should be made of the best leather, to avoid the susceptibility to sagging. The extra length will be required when a lens of long focus is used or when a subject very near at hand is pictured. The sagging will, sooner or later, spoil a picture, as the bellows will cut off part of the plate from exposure, and thus probably leave your foreground figure without feet or the steeple without a church.

RISING FRONT.—The front board carrying the lens should slide up and down. This is called the "rising and falling front." It is used when the subject to be photographed is not directly in front of and level with the camera. To keep our perspective correct, and the lines of the building before the camera parallel, the camera must be level, but it is obvious that ordinarily the camera is about level with the ground floor, while the building rises to heights above. If our camera is kept level, and the lens in the middle of the plate, we will have a lot of foreground which we don't wish on the plate, but only part of the building. The front board is supported by rods, up and down which it will slide. Thumb-screws lock it at any point. Some subjects rise too high for such cor-

rection; we are obliged to tip the camera to get these all on the plates.

SWING BACK.—It is not necessary that the camera, as a whole, be level, but simply that the ground glass (which, while used for focusing, occupies the exact position of the sensitive plate when the exposure is made) shall be kept perpendicular, to keep the lines of the building from distortion. Thus, if we tip the camera, but swing the ground glass to a perpendicular position, we accomplish two things at once: we get the tall object on our plate, and we keep the image free from false lines. To enable us to do this the camera is equipped with a "swing back." This is simply a double pivot in the middle of the frame holding the ground glass, which allows us to swing that frame to such an angle that it will be parallel with the subject to be taken.

Most cameras have a double swing back, which enables the operator to change the horizontal as well as the perpendicular plane of the ground glass. This is used to compensate for different focal lengths. For instance, in a landscape the nearby foreground will need an extension of the bellows (or distance between the lens and plate), while the middle distance or background will require the lens much nearer

A film exposed in the frozen North tells a story of cold; the man huddles his shoulders and keeps his hands in his pockets — each action telling of cold

the plate to be in sharp focus. In the chapter on lenses we learned that we can correct this by stopping down our lens, but this is at the expense of speed. If we use our swing back we throw the top of the ground glass that receives the image of the foreground farther away from the lens, while the bottom, intercepting the image from the background, is pushed nearer to the lens. Thus we can retain our speed and get "depth of focus" at the same time. This may sound involved on paper, but a very little experimenting with your camera will clear up the matter.

TRIPOD.—We should see that the tripod is substantial. A camera must be kept steady, and a flimsy stand is provocative of much moral turpitude.

GOING AFIELD.—Now let us go afield with our apparatus. We have with us camera, plate-holders filled with color sensitive plates, lens, ray filter, cap for lens, shutter, tripod, focusing cloth, actinometer, note-book—and a spirit of conquest.

We start out early in the morning, because the low sun gives long shadows, and does not flood everything with an even illumination, sinking the foreground into the background, and flattening every view. Before we leave the vil-

lage we pass the old church, with its spire climbing into the sky. We have learned that it is not well to get directly in front of a building so that a line drawn down the middle of the plate will divide the picture in half, for this would suggest an architectural drawing rather than a picture. Therefore, we put up our camera a little to one side, choosing which side from the position of the sun, remembering that it is better to have the light come from one side rather than from directly in front or from behind.

It will, perhaps, add to the interest of the foreground if we select such a spot as will cause the road in front of the church to cross a corner of the plate at an agreeable angle. This will fill up a gap, and give a near horizontal line to relieve the many perpendiculars of the church and spire. The camera being set up, we find that the lens, lifted to the top of the rising front, will not take in the whole of the steeple, so we tip the camera until the lightning rod appears on the ground glass. Then we use the swing back to make the glass parallel with the building. If we watch the image on the glass, we will see the lines of the church, which had converged towards the top, gradually straighten out until, when the glass is perpendicular, the

lines, too, are perpendicular. We will not select the right spot first, but after a few trials we will find the one which is best adapted to the view. It is scarcely the province of this chapter to go into the matter of exposure, for that is treated in the tables.

We then go farther down the road until we reach a turn. The road swings to the left, the rail fence following, while on the right stands a single tree. Something in that view attracts. We unlimber our outfit and study the scene on the ground glass. We have learned not to put our instrument in the middle of the road. In this instance we may put it on the left-hand side. Then we shall probably direct it so that the nearby road will swing part way across the plate before the curve farther off sweeps it to the left and off the plate. This will fill the foreground and give balance of line.

The tree then occupies the unused portion of our picture. If we have placed our camera just right, the lines of the road will converge on that tree and help our composition. If we have treated it as a foreground subject, our horizon line should be about two-thirds of the distance from the bottom of the plate; if we decide that the tree had better be smaller, and the whole scene a broader one, our horizon should be only

one-third of the way up the plate. All of these things we must remember as we look at the ground glass. We turn the camera this way and that; we tip it up and we tip it down; we carry it nearer the tree and farther from it. If we feel hurried, and think that we have not time to do all of this, we may compare the length of time now used on the subject with that of the life of the picture, IF it is a success. A failure is a waste of time anyway, and the moments used on it are moments thrown away.

One big advantage the camera has over our eyes. The four sides of the plate make definite boundaries. We can make them exclude the objectionable, the unessential, and include what is necessary to the picture. On our sensitive plate we carry home the vital factors of the scene; the rest is left behind.

We can treat the subject in such a manner as merely to represent Nature, with due regard to the general laws of composition, or we can treat it as a decorative arrangement of line or of light and shade, without thinking of it as a definite scene. Remember this, for some day it will enable you to keep a friend. Suppose he has asked you to take a picture of his house, and you find it hopeless in its want of the picturesque. You can scarcely call upon your lens

Accuracy of timing is as important as aim or speed ; notice the wad striking the water and the Aligator's eyes and nose to the left of it

to face such a subject, lacking in all taste. Forget that it is a picture of a house, but get some effect of light and shade, put a figure in the foreground, and sink the house into mere background. Make it a picture of your friend's child, and he will bless you forever more. This can be so managed that he will never know of the deceit which you have practiced. You have saved your own soul and a friendship at the same time.

SKIES.—Skies give an unlimited opportunity for making striking pictures. Constable, the English painter, is quoted as saying: "Certainly, if the sky is obtrusive, as mine are, it is bad; but if it is evaded, as mine are not, it is worse."

The use of isochromatic plates, a ray filter and underexposure gives us opportunities with clouds that the average worker does not dream of. The bugaboo of poor technical work holds back those who know enough to make use of it. If a scene is hopelessly flat or uninteresting, but possesses the lines adapted to make a foreground for clouds, and any clouds are to be seen, I always work for the clouds and let the rest of the view take care of itself. Constable seems right.

In landscape work, put in practice every

rule of composition that you know, and beyond this try to keep uppermost the sentiment of the scene. Make your picture tell a story, whether it is of the quietness, even solemnity of an evening subject, or the joy in the life of a child. It is this which will give it its highest value.

Chapter VIII

FIGURE WORK

THE vital factor in figure work is not the subject in front of the camera, but the man behind it. It is vastly more important that he have an appreciation of art and a keen susceptibility to sentiment than that he know the focus of his lens, the speed of his plates or how to mix his developer. We must try to tell a story, and tell it simply with characteristic attitudes and surroundings. It is important that we know our tools, but a thorough knowledge of them will, in itself, never make us more than good workmen.

Our first thought should be to express the sentiment that is kindled within us by the scene. With this desire we will naturally study the means best to accomplish it. We will pick up the laws of composition and balance of line and mass because we need them. Exposure and development of plates, the making and mounting

of prints, will be learned, for they will help us to express ourselves. If, on the other hand, our interest is in the technical side of photography, we may use all the time there is in pursuit of a better mechanical product. Or, if our efforts are directed in the line of composition, we may spend years in that study and never get over the threshold of artistic creation.

Instead of giving tables of exposures or other technical matters in this chapter, we will consider a few subjects and certain characteristic figures and surroundings. First, I must speak of Millet's "Angelus," for it is the incarnation of the idea that I am trying to convey. Study it until you know every line and have the attitudes and expressions of the figures engraved upon your mind. Consider the "Sower" by the same artist, and the interior *genre* pictures by Josef Israel. These simple stories of lowly life grip at the heartstrings. And how are they told? By one figure, two figures, three, and surroundings that melt into the nothingness of deep shadow. No lurid telling of the tale, mere suggestiveness.

To apply this method to a scene available to every camera-user in a big city, let us consider the inhabitants of the congested quarters of the town. If you were about to photograph the

people of Hester Street, perhaps your first idea would be to get a long-range view of the surging masses of humanity, to have every available spot on your plate occupied by a figure. You have looked at such photographs, in the newspapers, a thousand times. Can you remember a single detail? Did one ever grip you? Humanity in the mass is a subject for science, for sociology; the individual is a person to love, to hate, to fear, to pity.

I am never so lonely as in a crowd, consequently it is the loneliness of the East Side individual that I always seek to picture. Perhaps you are fond of society, like to talk and to meet people. Then you and I would seek to express different phases of the same life. I would picture the lonely push-cart vender of First Avenue. The pillar of the elevated railroad structure would divide my plate vertically, the framework of it would give a horizontal line across the top of the plate. The owner of the cart would be polishing his apples, rearranging his trinkets, holding out a sample of his wares to a passerby. His shoulders would be drawn forward to shut out a little of the cold. He would be alone, surroundings would fade into the gray of the dirty atmosphere. If the vender were a woman, her shawl would be held tightly

over her head and around her shoulders, to keep out the chill, to keep away the crowd, to give her privacy.

You, seeking to tell the other side of the story, would go up to Little Italy, where there is more room and sun and the people are light-hearted. Here, the push-cart venders gossip between sales. Two or three of them will gather together and talk with their hands, chatter like magpies, make and ruin the reputations of their neighbors, tell spicy bits of news, joke, laugh and cry. Christmas time offers opportunities for getting at the heart of the child of the poor. Shop windows are filled with toys, they are decorated with miniature trees and wreaths. The hungry child, scantily clad, will stop before it and every line of its body will tell the story of longing.

What is your idea of the life of a Gloucester fisherman? Is it conveyed by a photograph that was published not long ago of a couple of men in working clothes, handling a small basket of fish? Of course, this photograph was taken on shore, but that does not excuse it, for Gloucester fishermen spend much time ashore, and every earmark of their calling is shown on the wharves of Gloucester. Go there at the right season and you will find oil-clad fishers

lustily hauling great baskets of frozen fish from the holds of their vessels to the wharf. Not daintily lifting a lunch-basket with five little fishes in it, but heaving on blocks and tackle, they are throwing weight and strength against heavy baskets to bring the swinging mass onto the wharf.

Opportunities for composition are legion. Masts and wharves, figures and ropes give vertical lines, spars and booms, arms of straining men give horizontal ones. Action and toil appear in every figure. And yet, ninety-nine out of every hundred photographs of Gloucester fishermen are dainty, ladylike affairs, taken in the warm summer sun, with every figure obviously posing for the camera.

Use your mind before you waste a plate. It is too late afterwards. If you were asked for your idea of these toilers of the sea you would give a fairly accurate one, yet if you are of the ninety-nine and should take your camera to Gloucester, you would bring home photographs that would be a libel on the subjects and on your own intelligence. It is not easy, this getting hold of the heart of the thing, but it must be done if we are to get real representations of the subjects.

I have in mind some photographs which I

once took of a noted negro teacher. He is one of the great men of the times and yet,—his face is of an ordinary type. I had to get the pictures, but I didn't know how in the world to do it. So I tried two radically differing methods,—one the conventional, of a well-dressed man in his well-appointed office. Desk, chair, ink-well, bowl of flowers, telephone, secretary, all served to distract the attention and to put the photograph in the class of mechanical, processed attempts.

For the other, I pushed the camera so close to the subject that his head occupied the whole plate. The man's story was told by the expression of his eye and his forehead. The history of his race, his own fight for it, the burdens and sorrows that had been laid upon his shoulders appeared in those features. Most of this I discovered afterwards, in the print, but I hardly looked on the ground glass because I was so taken up with trying to follow the well-trodden path of getting a photograph of an expressionless gentleman in his office.

IMMIGRANTS.—The immigrants at Ellis Island are entering a promised land. In many cases they have left behind them a past of oppression and timidity and are entering the portals of a new life. The future is viewed with

faith and hope,—yet they are still afraid. This cannot be portrayed by the photograph of a deckload of them, and yet the usual camera-user never thinks of attempting any other view. The story can be told in the expression of the individual. So, too, can be depicted the tragedy of the deported unfit.

A LAMB.—The pleasure of being a lamb is not as well illustrated by a photograph of a field full of them as it is by a picture of the happy wiggle of one little tail. Just to see the soft, woolly creature so near at hand is to wish to be Mary.

A BIRD ROOKERY.—A small-scale photograph of a bird rookery is necessary to convey the idea of the number of nests in it, but the picture that we care to see more than once is of an old bird sitting on her nest, or a single family of youngsters lustily begging for food. We wonder if the mother bird is calculating the number of worms or frogs that her offspring will demand before they leave the nest. We wonder if the father bird does his duty as provider. The many details of bird housekeeping are brought to mind.

HORSE PORTRAITS.—If you are a buyer of horses you will wish to see that animal pictured in such a manner as best to show his

points. Length of leg, build of body, weight, carriage of head, gait, are all more important to you than the thoughts of the creature. But if we are using a camera we care more about the language of the ears and the expression of his eyes. Is he reaching over the fence, with ears stretched forward, looking beyond us? Our curiosity is excited. Is it a child with a handful of clover, a pretty girl with a lump of sugar or a stableman with a fresh parsnip that he sees? He thinks it is good, we may be sure, from the anticipatory quiver of those sensitive ears. Remember, we are talking about figure work and not landscape. It is a study of the animal and not his surroundings. A single horse, or a group of them, in a field, is a landscape study. Yet the dividing line between the two is a movable one and not always easily discernible.

ARIZONA PLAINS.—The plains of Arizona are wastes of sand, dotted here and there by tufts of sage brush. The pony of that land, unharnessed, is a wild, untamed little brute; saddled, but unmounted, he is the personification of sleepy laziness. If the Indian rider powwows at the store or in the hogan of another aborigine, he throws the bridle rein over the beast's head and leaves it. Thereupon the

creature goes to sleep, tail and head hanging limp, apparently without an evil thought in its small head. Here is our chance to tell the locality and life of man and beast with the simplest elements. A background of sand, punctuated by a single tuft of sage brush, a pony asleep with reins thrown over its head. The background melts into the distance, the Indian is suggested by the waiting pony, and the whole free, wild life of the plains is vividly brought to the mind of him who has once seen it by the mere suggestiveness of these simple features. Another story may be told by picturing the dash of the galloping steed or by the swinging of the lasso. Sleep or action, both are typical of the place and both tell the story.

Through these several illustrations I have tried to impress what was stated early in the chapter,—that through our picture we must seek to convey the sentiment that the subject has stirred within us.

Chapter IX

SPEED PHOTOGRAPHY

A HORSE trotting, I shall here speak of as a subject for speed photography, while a trotting horse, standing for his picture, has been referred to in the chapter on Figure Work. It is the action of the subject rather than its character that we may now consider, although it occasionally happens that we give a comparatively long exposure to an animal in action.

For success in this work it is essential that we have a reflecting camera. We must have the fast-working focal plane shutter, the ground glass in readiness for use, while the camera must be held in the hand. The actual speed of the ordinary shutter is probably rarely faster than one one-hundredth of a second, while that of the small, cheap camera is very likely to be only one twenty-fifth. Speed work requires exposures of from a hundredth to a thousandth of a second.

FOCAL PLANE SHUTTERS.—Imagine a window shade twice the usual length and mounted on a roller top and bottom. In the middle of the shade is a slit, say one foot wide. When the spring is released the shade flies across the window and the slit allows the passage of light for a brief instant through each part of the window, from bottom to top. If the slit is one foot wide, the window six feet long, and the shade takes one second to cross the window, it is apparent that light is allowed to enter for one-sixth of a second through each section of the window. By cutting down the width of the slit to one inch, we divide the exposure by twelve. By winding up the spring of the roller until it takes the shade one-tenth of a second to cross the six feet, we shorten the exposure in that ratio. Thus, with the inch slit and the spring wound up we would have an exposure of one one-hundred-and-twentieth of a second.

This is the principle of the focal plane shutter. The curtain works directly in front of and close to the plate. It protects the sensitive film before and after exposure and during exposure gives to each part an equal amount of light. With this shutter it is possible to make exposures of one fifteen-hundredth of a second.

It has one theoretical fault. The different parts of the plate are not exposed at the same time, and this should produce distortion in the image. As a matter of fact, in practice it is not noticeable.

USING A REFLECTING CAMERA.—In the chapter on cameras we have stated that a reflecting camera contains a mirror which reflects the image to a ground glass in the top of the box. On this glass we may watch the subject up to the moment of exposure. The plate holder occupies the usual position at the back of the box. Thus, when our camera is ready for action, the plate is in the holder with slide drawn.

The curtain of the focal plane shutter is wound up on one roller, the spring on the other set at the tension required and the slit in the curtain of such a width as to give the exposure which we have decided upon. The pressure of a thumb on the knob will throw the mirror up, cover the ground glass, release the spring of the shutter and our exposure will be made. Hence, having drawn the slide and set the shutter, we have only to watch the ground glass, keep the subject in focus and in its proper position on the plate until we decide that the instant has come to capture its photograph.

GRAFLEX *vs.* REFLEX.—In passing, it may be well to say that on the Graflex camera the focusing screw is on the right hand and the exposure knob on the left side of the box, while on the Reflex the reverse is true. This may seem a minor point, but it often spells success or failure, for if one hand has learned to manipulate the focusing screw and the other to press the exposure knob on instantaneous orders from the brain, it is not easy for them to exchange work. The point of this observation is,—don't change your instrument. Both are good machines.

MAKING AN EXPOSURE.—Rising from the top of the camera, over the ground glass, is a hood to shield the eyes from outside light. This is held in position by springs and closes down inside the box when not in use. The instrument may be carried with shutter set, slide drawn and box closed. Touching a single spring releases the top, which flies up, carrying the focusing hood into position and causes the small door protecting the lens to fly open. Thus the operator has only to put his eyes to the hood, screw forward the lens to the proper focus and press the knob, to make an exposure. It is almost done with one motion.

TO FIND THE TIME REQUIRED.—In practice, to find the time of exposure required by various subjects, the easiest way is to consult the tables. These will need considerable revision if we seek extreme sharpness, but this quality is neither necessary nor desirable. To illustrate the method of obtaining these results and the actual speed needed to cut out perceptible motion we will take the case of a boy running eight miles an hour, at right angles to the camera and fifty feet distant from it.

The eye will recognize a movement of more than 1/100 of an inch on the plate. A six-inch lens, focused on an object fifty feet away, gives an image on the ground glass of 1/100 the size of the original. Therefore, if we give an exposure of one second, the object must not be moving faster than one inch in that time if it is to show on the plate without apparent blurring. But a boy running at eight miles an hour travels 140 inches in a second, so the exposure must be 1/140 of a second. If we use a twelve-inch lens the image will be twice the size of that with a six-inch, and therefore the time must be only half, or if the subject is only twenty-five feet away the image then, too, will be twice the size.

If you want the best the country affords, go to Canada in the winter time ; cold and snow are specialties of the north

But, as I said at the beginning of this paragraph, we do not need extreme sharpness. The idea of action and motion is better conveyed by a certain amount of blur. Unless there be dust or flying veils to give the effect of fast traveling, a sharp picture of a speeding automobile would look exactly like one taken of it at rest. A photograph of a flying bird should show fuzzy tips to the wings; of a leaping fish, blurring around the tail, to convey the idea of wiggle to that member.

As a subject of this chapter, "speed" and "sport" are almost interchangeable terms, and the successful photographer of speed subjects must be a sportsman. He must be indefatigable on the trail, imbued with the enthusiasm that carries him over difficulties and be imperturbable in sight of the quarry. He must know when to take his picture and aim without consciousness of using the sights of his weapon. But these are the heritage of most men who will venture into the field of sporting photography and need but be developed.

KEEPING THE EYES OFF THE GROUND GLASS.—Whenever it is possible to do so, avoid looking on the ground glass, and keep the eye on the subject as it approaches. It is necessary to see what is about to happen

as well as what is happening, for it takes an appreciable time for the order of the brain to be obeyed by the hand, and in that fraction of a second the cream of the action may have come and gone.

Often we can do the focusing first, at leisure, and watch the subject without keeping our eyes glued to the hood. For instance, if we are photographing a trotting horse, we know almost exactly where he will pass us. We can select the spot where we think it is desirable for the horse to be when we make the exposure and focus the camera on that spot. With our eyes then free to watch the coming of the animal, we wait for him to reach the site of our picture-taking. In this way we have time to study the background and surroundings on the ground glass before we strain every faculty to catch the flying subject. So essential do I deem this freedom of vision that I never watch a leaping fish on the ground glass, but trust to a scale and judging the distance.

One can often have several spots ready focused, know the exact distance of each from the camera, and then watch the subject. A gridiron may be so studied, and the photographer be left free to watch the ball and the players and yet keep his camera in focus without look-

ing at the ground glass while things are happening. Do not understand this as suggesting the use of the scale camera rather than the reflecting instrument, it is really a combination of the two. Use the reflecting ground glass to do the focusing before the action begins. Study the various likely points and know just how far off is each one of them, and then watch the game. There is no guesswork in this,—you know the distance. Of course, every time that you move, the thing must be done all over again, and likewise, of course, you must have a scale on your reflecting camera as well as the ground glass. This scale is described in a later chapter.

ACCURACY OF TIMING.—Occasionally accuracy of timing the exposure is as important as aim or speed. For instance, if you wish to take the smoke issuing from the muzzle of a gun, the shutter must act within a very small fraction of a second of the right time, or a complete failure will result. If the plate is exposed too soon, you will merely have a picture of a man holding a gun; if it is too late, the smoke will be some distance from the muzzle, and the barrel, thrown up out of line by the recoil, will produce a ludicrous effect. One of my most successful shots of this kind shows the smoke issuing from the muzzle, the wad

striking the water, and the alligator's head on the surface of the pool a little to one side of the wad.

GROUPING OF SUBJECTS.—Some subjects are dependent on arrangement as well as action, and this must be watched for on the ground glass. Children playing will group themselves while running across the field of the plate, and to catch this just as we want it, we must see it on the ground glass. For it is a matter of arrangement, size and location on the plate, as well as action, that must be watched.

WHEN THE LIGHT IS POOR.—In the matter of wild game, it will often happen that the subjects are in woods or ravines where the light is of the worst. A certain exposure must be given or we will get no image on the plate. This will probably be many times the length of exposure that the action of the subject will allow. We can only wait for the instant when the motion is comparatively slow and trust to catch an arrested action picture.

It is sometimes possible to get figures outlined against the sky and thus get silhouettes when the light is too poor to get any other form of picture. Years ago, at Albuquerque, I used this scheme to get some photographs of bucking bronchos, after the sun had set. There was

Underexposing a plate with a ray filter. It is not nature, it is not art, but it is worth more than either — for an experiment

nothing else to do,—the ponies were going through the most spectacular stunts, the light had failed, but I had a lot of unused plates. The results surprised me so pleasantly that since that day I have used plenty of plates on what seemed like forlorn hopes.

And now a word or two of general advice: Keep the subject of the picture as simple as possible; have few figures, but make them tell something,—a story of action, desire, striving.

Keep the surroundings in the background; don't let them distract the attention or interfere with the outlines of the subject. The figures must stand out and this is difficult to attain with rapid exposures. If you have the figures in front of an open expanse of sand, sky, marsh or plain, so much the better. Another way is to have the figure near at hand, then the diffusion of focus will throw the background into misty vagueness.

Have the figures as large as possible on the plate, for perspective and size will make the difference between good and bad.

Under-expose as little as possible, run the risk of a good deal of blurring rather than a plate with faint outlines of a picture.

Pursue your own bent. If you are a naturalist, try to get pictures from this point of view,

but if your interests are artistic, photograph wild life for pictorial effect. It is what you will do eventually and you will save time if you frankly do so from the first.

Chapter X

PICTURING THE LEAPING TARPON

THERE is danger in picturing the tarpon, the danger of not finding him. It will take patience, more than you realize, to get the opportunity. Tarpon are not caught by every fisherman that goes for them. Men have gone to Florida, year after year, and spent fortunes hunting them, without getting one. Now, you must not alone catch them, or have them caught, but it must be under conditions permitting the use of your camera.

If you try to manage both rod and camera yourself, by the time you are ready with the latter you will need a telescope to see the tarpon. If your friend attends to the rod or line and your fisherman manages the boat, even then not every jump of the fish will give your camera a chance. Indeed, this will happen so seldom that you cannot afford to lose it when the chance does come, but must always be ready for it.

That is really the most important thing about this work,—to be ready, always and eternally ready for the leap, and to get it. You cannot afford to be startled—until afterwards. Expose the plate first and then be as startled as you like. I have had them jump so near that I expected them to land in the boat, if not on me, but I never had time to allow this thought to affect me until the shutter had been snapped and the exposure made. My boatman has even shouted to me to jump out of the way, so certain did it seem that the creature was going to hit me on its return to the water, but my job was first to expose that plate.

APPARATUS. — Several devices have seemed necessary, but, with one exception, I have discarded them and done better work without their aid. The one necessary adjunct is a focusing scale that works by sense of touch, for you have no time to hunt up the ordinary scale of figures, nor have you time to find the image on the ground glass. Your eyes must be kept on the fish, on the water, on the line, on the background—everywhere except hidden in the hood of the ground glass.

My focusing scale is much like the face of a clock, with the knob of the screw projecting through the center. From this knob projects

a small pointer, like the minute hand of the timepiece. Each focal distance is marked in raised figures, which I feel with my forefinger. Thus, without looking at the scale, I can tell at what distance the lens is set and can shift it to any other by a motion of the thumb and finger that hold the knob. After practice this can be done almost automatically. Frequently I have focused and made an exposure without the consciousness of having even judged the distance of the fish from the camera.

As for marksmanship, that is a matter of inheritance and practice. I never found sights other than a nuisance. There is not time to find them nor to use them, and they enforce an impossible attitude with a heavy camera. I simply hold my camera against my chest and know when it is held true. For the quick and accurate centering of any object on the plate I probably have to thank my ancestors of hunting prowess.

CAMERA.—But to go back. You will take a reflecting form of camera and equip it with a sense-of-touch focusing scale, otherwise make no change in it. The reflecting camera is necessary because the focal plane-shutter must be used and the slide of the plate-holder drawn, ready for use.

No focal plane curtain in existence will protect the plate during the long hours of waiting in the strong light of Florida; you must have the added protection of the mirror. This is apart from the fact that you often want to study your backgrounds and verify your guesses at distance by looking at the ground glass. It is well to have waterproof cases for camera and plate-holders, for this pursuit of the tarpon will take you out in all sorts of weather and carry you to rough places.

PLATES AND EXPOSURE.—In plates, my preference is for Isochromatic of medium speed. The light on the water is so strong that I prefer the better quality of these slower emulsions to the added speed of the faster ones. I have had better results from longer exposures than from the very rapid ones, and I usually set my shutter for about a two-hundred-and-fiftieth of a second. Sometimes the lens is stopped down, but generally it is left wide open.

TACTICS.—The easiest way to catch the jumps is to have the camera in the same boat with the fisherman. Holding the camera on your knees, you sit in the stern of the boat, facing aft. The fisherman sits just behind you, with the line passing by your side and over the stern. This line is marked with bits of ribbon.

Fifteen feet should be designated by a white ribbon, twenty-five by red, thirty-five by blue, fifty by a bit of green. Thus, by merely glancing at the line by your side, you can tell just how far away the hook is, and have your camera ready focused for that distance. If a fish strikes the hook and immediately jumps, all that you have to think of is to have the instrument aimed correctly and to press the exposure knob at the right instant. If the fish darts towards the boat or jumps directly at you, some allowance must be made, but the hand quickly becomes accustomed to this work, and will change the focus without conscious orders from the mind.

A skilful fisherman will play the creature lightly while you are changing plate-holders and reserve the harder tugs for the times when you are ready to make an exposure. He will try to keep the fish near at hand and will give orders to the boatman to pull ahead or back the boat, as seems necessary to keep the quarry at the proper distance. You will have suggested to them both which light you would rather have in the case of a fish striking the hook. This you must do before the game begins, as well as having seen and studied every background on the horizon, so as to be ready to take advan-

tage of every aid that is offered for a better result.

Sometimes you will want to keep the camera near the surface of the water to add to the apparent height of the jump, sometimes reverse this process and stand up in the boat. The latter must be done if the water is rough enough to make the intervening waves interfere with the view of the fish. By the time that you have stood for half an hour in an uneasy skiff, holding a heavy camera, you will have a pain in the small of your back that will make you forget all temporal woes and joys. You will then sit down and let the fish go hang.

But this method of photographing the jumps will give you only a picture of the fish and none of the fisherman. It is the simplest and surest, but lacks that vital feature,—the human interest. For the other work, you must have a small motor-boat with which to follow the fisherman in his canoe. Your boatman must be instructed beforehand concerning the distance to keep from the fisherman,—be that twenty-five, fifty, or a greater number of feet. He must be told that you prefer to have the sun behind you, at your side, or in front of you, as the case may be. He must know that it is important to have the fish jump slightly nearer to you than is the canoe

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Florida in the Good Old Summer Time

with the fisherman, so that the foreshortening of the lens may work to your advantage rather than against you. You must tell him that the palmetto tree on the bank will make a good background, and that it is desirable to get it behind the fish.

The fisherman and his boatman must be taught that it is essential to keep the fish near the canoe, for your lens will take in a very limited angle of view, and to get them both on the plate necessitates that they be very near together. The fisherman must know that he is handling the fish for the sake of the camera and that one jump with everything just right is more to be desired than the landing of twenty of the beautiful creatures.

This is really much simpler than it sounds, for the work is divided up and each man does his part. The fisherman plays the fish for the camera, the canoeman keeps the canoe on the opposite side of the fish and near to him, while your own boatman keeps the boat at the proper distance and with the sun in its proper position. That is, these things are done as nearly as may be. The fish seldom allows all of them at the same time and frequently will not permit any of them. Moreover, the first jump is usually the highest, the one that comes with least warning

and the most uncontrollable. The best opportunities come at the hardest times. Sometimes the most startling jumps are those made in narrow rivers, under overhanging trees, where the lack of light makes photographic work impossible. I have caught fish by moonlight when magnesium would have been needed to supply light for camera work.

I once saw a tarpon jump high into the air, his burnished silver side glistening in full sunshine, while behind him, and within one hundred yards, a solid mass of rain was falling in the darkness of black clouds. It was unearthly, indescribable, but wonderfully beautiful, and I shall always think that I have failed to get my ideal jump picture because of that one sight when my camera was put away in its waterproof case.

DON'TS.—If you wish to photograph the leap of the tarpon:

Don't think that an ordinary camera will do,—use a reflecting form with a sense-of-touch focusing scale.

Don't use too high speed,—you sacrifice too much quality in the negative.

Don't lose your head when the fish jumps—expose the plate first and then be scared as you like.

Don't let your boatman make you think that nobody uses a hand line,—he simply doesn't know.

Don't let your friend forget that he is fishing for the camera—a picture of a jump is worth twenty dead tarpon.

Don't forget your stock of patience—you will need it all and had better borrow a lot from the folks at home.

Chapter XI

SEA PICTURES

THE changing moods of the sea present a veritable mine to the camera worker. He can preëmpt a square yard of shore and from this vantage point obtain pictures of storm and stress, sunsets and solemnity, childish joys or the perils of fisher folk. Sea and sky, foreground and background, will work together for him, and he needs but the patience to await and the perception to grasp opportunities as they appear. He can get yet different aspects from long piers which thrust themselves out into the sea, while the view from the deck of a steamer will be an unending panorama.

A central idea is essential. Some one feature must predominate. Do not let sea and sky clash, for one must subordinate the other. Arrange them so that the picture will have unity

of idea and composition. It may be a study of the single wave or the action of waves. The one is pictured by the individual, the other by a group. In the print, staring white of clear sky should be toned down by unobtrusive clouds. Either an unbroken expanse of white or spectacular clouds would draw attention from the waves which supply the *motif* of the picture.

The unceasing undulations of the ocean, extending as far as the eye can reach, present another aspect of the sea. Repetition, wave following wave, is the keynote to successful handling of this subject. Do not break the long lines of the sea, keep the sky in monotone, concentrate the interest on wave following wave. The dash of huge breakers on the rocky coast of Maine offers yet another phase. The swirl and eddying of the waters will require steadying influences. If rocks appear, they must be in masses, for the spotty effect of little points of black will spoil the picture.

The weakest part of the composition is likely to be the foreground, but this only needs to be carefully considered. Human figures, breakers, sand dunes, rocks, shells, boats hauled up on the beach, wrecks, piers, can be made to do duty as foreground subjects. Be careful not to get

directly in front of the incoming wave, for this would give a line straight across the plate such as we learned to avoid in our landscape work. Study surf and wave action before you try to picture them. Watch the wave as it breaks, and decide whether you prefer to take it just before the crest falls into foaming white or a little later. Keep your horizon line level.

LIGHT AND HARMONY.—If you are photographing yachts from the water, remember that the noonday sun will make the sails sink into the sky, and that a three-quarter view is usually preferable to either side or end.

> "Vessels large may venture more,
> But little boats must keep near shore."

When we photograph the stately four-master or the gigantic steamer we must suggest the deep sea, while with a canoe or puffy little tug we should convey the impression of nearness to shore.

EXPOSURE.—Mr. Osborne I. Yellott exposed some Cramer Crown plates on sea views during the latter part of August. The fact that he stands sponsor for the results is evidence of their success. Therefore, we can scarcely do better than quote his exposures:

5.45 A.M.	Sun behind clouds.....	F8 stop	1/50 second
7.00 A.M.	Fairly bright sun.....	F22 stop	1/50 second
8.00 A.M.	Bright sun in front of camera.....	F22 stop	1/100 second
9.00 A.M.	Cloudy.....	F11 stop	1/100 second
11.30 A.M.	Bright sun.....	F16 stop	1/100 second
12.00 M.	Bright sun.....	F22 stop	1/100 second
4.00 P.M.	Bright sun.....	F20 stop	1/100 second
6.00 P.M.	Fairly bright sun.....	F11 stop	1/50 second

PLATES.—I should never use an ordinary plate for seashore work, but would choose a double-coated orthochromatic brand of medium speed. Halation is likely to trouble us, and to avoid this we must use double-coated plates or those backed, to prevent this difficulty. Films are not susceptible to this objectionable feature.

RAY FILTER.—A ray filter is almost a necessity in obtaining proper values in water, sand and sky, while an actinometer will help us to judge correctly the actinic quality of the light.

Chapter XII

IN THE GOOD OLD WINTER TIME

NORTH and south, winter and summer, offer opportunities to the photographer. Fashion decrees that the tourist go south in the winter and north in the summer. The camera too often follows the tourist. What is the result? The southern winter is a weak replica of that of the north. The northern summer is an immature development of a southern specialty. Our sensitive plates cannot portray what is not before our lens, and as a consequence we get insipid photographs. Barring certain technical mistakes, the veriest tyro can make his film exposed in the frozen north tell a story of cold, and his picture taken under the summer sun of Florida breathe balm and sunshine.

The following account of the author's experience on a winter trip to the Canadian woods is virtually as it appeared in the *Photo-Era*:

It didn't seem so very cold that morning when we got into the sleigh, but before we left it my breath had congealed into solid ice on the inner side of the scarf that I wore around my face, and my eyelashes were frozen together. When we stopped at a habitant's for dinner I could scarcely walk from the sleigh to the house. The cold had found every crevice and the bitter wind which we had faced for hours had driven it straight through the many thicknesses of clothing, until I was fast sinking into a condition of lethargy. It was considerable time, even under the influence of a hot kitchen fire, before I could remove the outer layers of garments. My one comfort was that my companion, inured to drives when the mercury was freezing, was thoroughly chilled, and even the driver, enveloped beyond recognition in a huge fur coat, was nearing his limit of endurance when we stopped.

I had been vaguely wondering how my camera was expected to catch the lumber-jack at his work, or how it was to learn of the life at Hudson's Bay Company's posts, when its operator was too cold to care whether he was alive or dead. But after thawing for an hour before the warm fire and stowing away an astonishingly large dinner, I dropped some of the

gloom of the morning and began to consider camera demands. Outside was a country the like of which I had never seen. Several feet of snow covered the ground, the sun shone brightly out of a cloudless sky, and the atmosphere glittered with cold—intense, dry, metallic cold. The smoke from chimneys hovered close, as if reluctant to go out into the frozen wilderness. It was all a new world to me and I simply had to get some photographs.

Camera and plate-holders were packed away in the bottom of the sleigh under a pile of robes and various impedimenta, and it was a work of considerable time to extricate them. But the joy of the scene on the ground glass made up to me for the hardship of the long drive, for on it was reflected the beauty of color, although the plate could translate the picture only into black and white. Mittens are clumsy things, and I could not turn the focusing-screw without removing the one from my left hand. Then I found that I could not easily press down the exposure-knob without taking off the right-hand one. The slide of the plate-holder stuck, and I took off the silk glove, too, from my right hand.

After exposing a plate on a particularly charming view, I happened to look at my hand, and discovered the tell-tale whiteness of thumb

and forefinger. Hastily putting down camera and plate-box, I grabbed a handful of snow and gave that freezing hand a vigorous rubbing. Then it seemed about time to return to the kitchen. I entered the room, only to have my companion pull me outside and savagely massage my face with snow.

That particular picture will always possess an added interest for me. It reminds me of the boy who was kicked in the face by a mule. When he slowly came out of unconsciousness he anxiously inquired if his beauty had been spoiled. "You will never be as handsome, my son," replied his father, "but you will know more." I am yet looking for a solution to that problem of a practicable way to protect my face in extremely low temperature. A foray in picture making when the mercury is low in the bulb means an occasional massage with snow to work out the frost. A series of pictures taken one morning cost four distinct freezes. Another set combined a frozen nose with clothes wet with perspiration. The trail had led over a hard hill, and the necessary violent exertion that served to drench my clothes could not prevent the exposed portions of my anatomy from almost literally turning to ice.

But these are scarcely troubles. The good

things far overbalance them. When, the following spring, I went over much of the same region, I vowed that never again would I wander through the woods of Quebec save in the winter time. At every stop, in the season of cold, I had to limit the plates to be used on landscape work to the number that I could spare from more pressing demands. The snow scenes were entrancing; everywhere were views crying to be taken. The spring offered no opportunities whatever in this line. I spent four weeks following the log drives and used not a single plate on a landscape.

If you want the best that the country affords, go to Canada in the winter and, by all means, go to Florida in the "good old summer time." Both extremes have their individual ways of attacking plates and camera, but neither calls for special apparatus. Plates deteriorate under the tropical sun, but stay good in the northern cold. But, then, oil never coagulates in the warmth of the south, while it makes a shutter immovable in the north.

I knew little about the conditions which I was to face, and sought advice. My camera and plate-holders were taken to a sporting goods house with the request that their case man be turned loose on the job of preparing them for

the trip. My Reflex camera is nearly as big as a house and as heavy as a trunk, so neither size nor weight could be unnecessarily increased, and this limited the workman's opportunities. As a result of his efforts the camera was fitted with a pantasote case, the top of which fastened with patent snap-catches, and was made practically waterproof by an inner throat of soft rubber cloth with a tie string. Around the working parts of the camera, the case was reinforced with leather.

The plate-holders were first enclosed in a wooden box, and this fitted with a pantasote case. Both have been left out in tropical rainstorms and in blizzards of snow without injury. The neutral color prevents the absorption of too much sun in the south, and soaks in enough heat from its rays in the north. My extra plates were carried in the original crates, around which were wrapped several thicknesses of rubber cloth.

I knew that the cold would make trouble with oiled springs, and so I sent my camera to the factory with instructions to wipe all working parts dry. With apparatus so prepared, the remaining responsibilities seemed to rest with me.

Too sudden raising of the temperature must be avoided as scrupulously as the plague. One

day my bared hand was left for an instant too near the lens. The condensation formed a thin cloud of ice that took me an hour to thaw, even with the help of a warm room. Another time the camera was brought into a warm room and immediately collected drops of moisture on all the metal parts. These drops formed little lumps of ice the moment the instrument was carried out again into the cold. Of course, nothing would work until the whole apparatus had been warmed through and thoroughly dried. After that experience neither camera nor lens was brought indoors until the end of the trip.

The trouble came with the holders and plates. The latter could not be handled in the cold, and must not be warmed too suddenly lest condensation ensue. By bringing them into the house at night, wrapped up in the protecting cases, the heat soaked through so slowly that by morning the plates in the holders could be packed and the holders easily refilled in a changing bag.

The biggest error that I made was in the matter of exposures. Camera-users dinned into my ears the strength of the snow-light and the certainty of over-exposure, until I was afraid to take the cap off the lens. A well-known pho-

tographer and his collection of spoiled plates were quoted to me as a warning.

My ray filter was overworked. To be sure, it frequently didn't tell the truth, but it caught some atmospheric effects that were at once unexpected and spectacular. Proper photographers warn you against under-exposing a plate with a ray filter, but what proper person ever got the best out of life? Silhouette a figure against a cloudy sky and then expose for the sky, some day, and see what you get. It will not be art, it will not be nature, but it will be worth more than either to you—for an experiment.

Chapter XIII

WILD LIFE

THE nature writer may treat animals as beasts who cannot reason, or he may impart to them thoughts and motives akin to our own. The photographer may picture them as a part of their surroundings or he may seek to tell some story of their lives. To do the former, he pursues them to their lairs, using a lens instead of a bullet—first. To do the latter, he must enter into their lives, first and last. It is impossible for the man who uses a gun to make his photographic plates express kindly sentiment in the creatures that he destroys.

Much of the success that I had with photographing birds and reptiles in Florida was due to a boy, who acted as one of my guides. He would dissolve in tears at tales of cruelty. He once tried to shoot up a rookery, but although he badly needed the money, the cries of the

hungry little birds caused him to abandon an enterprise that bade fair to net a thousand dollars. He wasn't afraid, he was simply tender-hearted. Whenever an anchor had to be dove for in shark-infested, swift-running tideways, the boatmen who laughed at his tears were ready enough to let him go overboard. Birds and beasts instinctively trusted him, and obeyed his orders. For a week our houseboat was anchored beside a mile of rookery. In those seven days not a shot was fired, and the birds became so friendly that it was difficult to get them to fly. They had ceased to be afraid. Harrison fed them, fondled them, spanked them and made them pose for the camera in all manner of attitudes.

He handled alligators and crocodiles with the same freedom. I have seen him wade into a mud-thick pool, feel around with bare feet until he found a 'gator, lift it to the surface on his toes, grab its jaws and flounder through mud and water to the shore with his captive. He would hold open the jaws of a saurian half as long again as himself, or pull its tail until the creature chased him across the prairie.

I believe that this would be impossible to the man who habitually shoots wild creatures. He could neither handle them nor photograph them

so as to show their human side,—if I may so call it. The sportsman may get long-range shots at game with his camera, he may capture them on his plate by flashlight, he may conceal himself in a blind and get them unawares, but he will never get this side of their nature.

A requisite for photographing wild game is honesty. The codes of ethics are many, but the nature photographer must live up to his own ideals if he wishes his work to be accepted by the world as genuine. I will illustrate this by citing two codes. One of the best-known and scrupulously honest of such photographers has in his collection remarkable pictures of wild animals in the open, but also those of such creatures in the zoo. My code forbids me to photograph in a zoo, I want my prints to show wild creatures in their native habitat. On the other hand, I do not hesitate, if occasion requires, to obtain my wild creature first by means of a lasso, turning him loose on a small prairie or key, with a boy to head him off from his home while I chase him around with a camera.

A typical example of the conflict of our ideals is shown in a photograph of fire-hunting the alligator. The other man wouldn't own it, while I am as pleased with it as with any of my game pictures. It shows how the reptile is killed by

that method of hunting, and market hunting is practically all done that way. The man firing the gun is an old 'gator hunter, the bull's-eye lantern is one which has been used for that very purpose, the skiff has carried the carcass of many dead reptiles. The creature shown in the picture was captured with a lasso only a few miles from the scene of the photograph. It is unharmed and unafraid. A few hours after this picture was taken, it was released to return to its domicile. The weak link in the chain is the fact that the alligator had to be held in position by a rope tied to one leg. In the daytime the boy could chase it with a club, outrun and outmaneuver it, but at night this was impossible. To get a picture of fire-hunting that would illustrate the subject, that would convey the idea, I was forced to tie a string to the creature's leg. And my own code of photographic ethics allows me to do this.

Two characteristic alligator attitudes are—lying asleep on a sun bath and quietly floating beneath the water with only the tip of the nose and the eyes showing above the surface. Either of these poses tells the story of many waking hours of the creature. If you glide quietly around in a skiff, you may see both of these sights at long range, but almost never will the

reptiles be caught sufficiently off their guard to allow a near approach.

Sun baths and expanses of water are plenty, alligators may be caught with a rope, a net or a boy wading into a pool. A man accustomed to handling them will make them pose for their picture with more ease than you can get a society girl to sit for her portrait. The creature may thus be portrayed with every accessory true to nature, himself unharmed, his home exactly as it would be without a human being within a score of miles. The one change which has come over the subject is an acquaintance with fear. He has met man and been conquered by mental force rather than physical.

The Florida crocodile was a shy creature some score of years ago (he has joined the genus dodo now), but the same tactics that were successful with his cousin, the alligator, were of use with him Caught in a net and liberated on a small, open key, he would give a performance punctuated with clicking of the jaws and pursuits of his captors. After some of his energy had been spent he would exhibit the quieter moods of sunning himself and lying at the mouth of his cave, head above the water.

I am not taking space to tell what exposure I used or what brand of plates were in my

holders when these opportunities came to me, for the factor was the character of the opportunity and not the make of lens.

Wild turkeys have rarely been photographed. In the midst of the Big Cypress Swamp is a three-hundred-acre grape-fruit plantation, belonging to a friend of mine, where hunting is tabooed. The road to this plantation is neither dry land nor water, one can neither walk nor swim, but the wild turkeys wander through the grove as regardless of man as the barnyard variety. Therefore, the enthusiastic photographer, having received permission to go there, transports himself and his outfit across the impassable morass, regardless of difficulties. The boundary of the plantation is a dead-line known as familiarly to the turkeys as to the owner. Once within its shelter, the birds are without fear and hobnob with the workmen, but outside of its protection they put on their native shyness as if it were a garment taken from the hat-rack.

On a little key near Cape Sable a family of big blue herons had their home. We happened there when the babies were a few days old and again when the infants were learning to fly. Harrison became master of ceremonies, and under his tuition the children did everything

that children could do for the camera. He held a harpoon-pole just under the water for them to stand on. A little rolling of the pole would cause the bird to lose his balance and his wings would outspread. After an hour's seance, Harrison returned the babies to their nest, wiser little birds.

Here and there are little oases, where the olive branch is held out to the creatures of the wild. Ducks swim around certain great hotels and in certain lakes on Long Island; bears act as garbage gatherers in the Yellowstone; deer harvest the crop of some orchards in Massachusetts; squirrels eat from the hands of children in the city parks. Some one of these is within reach of every user of a camera, and the photographer need not wait about setting forth on the trail.

In photographing animals it is important to avoid sudden motions. The quiet, almost imperceptible action will not startle the creature, while the quick movement of hand or body will send it scurrying for its hole. If you are photographing a maddened swarm of bees, a sudden move will bring down trouble, while if you let them crawl over face and hands and buzz around your head you may escape altogether from their stings. If a half-wild lynx lands on

your head at night as you lie sleeping in the open, this same keeping still first may save a severe mauling. I have tried them, and speak from experience.

INDEX

Actinometer, 37.
Action pictures, apparatus for, 104.
  Exposure for, 106.
  Of tarpon, 103.
  Plates for, 106.

Bromide papers, 59.

Camera, hand, 20, 23.
  Reflecting, 17, 21, 22, 94.
  Tripod, 19.
Chiaroscuro, 71.
City scenes, 85 et seq.
Composition, 12, 13. 67 et seq, 100.

Developers, carbonate of soda, 44.
  Hydroquinone, 43.
  Pyro, 44, 45.
  Pyroacetone, 47.
  Rodinal, 43, 45.
Development, after treatment, 49.
  Factorial system of, 43.
  Formula for, 51, 60.
  Tank, 48, 49.
  Temperature, 50.
  Tray, formula for, 51.

Exposure, 35.
  For action pictures, 106.
  For sea pictures, 115.
  Tables for, 38, 39, 40, 41.
  To find time of, 95.

"F," value of, 25.
Films, 32, 33.
Fixing, 52.
  Formulas, 58, 60.
Focal length, definition, 25, 26.
Focal plane shutter, 21, 93.
Focus, 28.

Graflex—see Camera (Reflecting).
Ground glass, 20.

Hydroquinone, 43.

Jena glass, 24.

Landscapes, 74, et seq.
Lenses, 24 et seq.
  Anastigmatic, 24.
  Telephoto, 26.
Light, actinic, value of, 37.
  Harmony and, 114.
  When poor, 100.

Plates, contrast, 30.
  For seashore work, 115.
  High speed, 31.
  Orthochromatic, 43.
Printing, 64.
  Bromide papers, 59.
  Carbon, 61, 62.
  Platinum, 58.
  Solio, 54.
  Velox, 60.
Pyro, 44, 45.
Pyroacetone, 47.

Ray Filter, 30, 115.
Reducer, Farmer's, 52.
  Persulphate, 52.
Reflex—see Camera (Reflecting).
Rodinal, 43, 45.

Sea pictures, 112 et seq.
Sky photography, 81.
Solio, printing, 54.
Speed photography, 92 et seq.
Stops, 28, 40.
Sun, proper position of, 39.

Tarpon, photographing, 103.
Toning, 55.
  Formula for, 56.
  With Solio, 55.

Velox, 60.

Wild life photography, 124 et seq.
Winter photography, 116.

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The manager of a mine in Nome, Alaska, writes as follows: "I have been on the trail for years (twelve in the Klondike and Alaska) and have always wanted just such a book as Dr. Moody's Backwoods Surgery and Medicine."

THE BULL TERRIER, by Williams Haynes. This is a companion book to "The Airedale" and "Scottish and Irish Terriers" by the same author. Its greatest usefulness is as a guide to the dog owner who wishes to be his own kennel manager. A full account of the development of the breed is given as also description of best types and standards. Recommendations for the care of the dog in health or sickness are included. The chapter heads cover such matters as:—The Bull Terrier's History—Training the Bull Terrier—The Terrier in Health—Kennelling—Diseases.

CAMP COOKERY, by Horace Kephart. "The less a man carries in his pack the more he must carry in his head", says Mr. Kephart. This book tells what a man should carry in both pack and head. Every step is traced—the selection of provisions and utensils, with the kind and quantity of each, the preparation of game, the building of fires, the cooking of every conceivable kind of food that the camp outfit or woods, fields or streams may provide—even to the making of desserts. Every recipe is the result of hard practice and long experience. Every recipe has been carefully tested. It is the book for the man who wants to dine well and wholesomely, but

in true wilderness fashion without reliance on grocery stores or elaborate camp outfits. It is adapted equally well to the trips of every length and to all conditions of climate, season or country; the best possible companion for one who wants to travel light and live well. The chapter headings tell their own story. Provisions—Utensils—Fires—Dressing and Keeping Game and Fish—Meat—Game—Fish and Shell Fish—Cured Meats, etc.—Eggs—Breadstuffs and Cereals—Vegetables—Soups—Beverages and Desserts.

> *"Camp Cookery is destined to be in the kit of every tent dweller in the country."—Edwin Markham in the San Francisco Examiner.*

CANOE AND BOAT BUILDING, by Victor Slocum. All of us like to think we could build a boat if we had to. Mr. Slocum tells us how to do it. Designs are given for the various types of canoes as well as full descriptions for preparing the material and putting it together. Small dories and lapstreak boats are also included.

CATTLE DISEASES, by B. T. Woodward. Mr. Woodward takes up in detail the various common diseases to which cattle are liable. His book is designed for the aid of the practical farmer in cases where the skilled veterinarian is not necessary. A careful description of the various diseases is given and the accepted forms of treatment stated.

EXERCISE AND HEALTH, by Dr. Woods Hutchinson. Dr. Hutchinson takes the common-sense view that the greatest problem in exercise for most of us is to get enough of the right kind. The greatest error in exercise is not to take enough, and the greatest danger in athletics is in giving them up. The Chapter heads are illuminating. Errors in Exercise—Exercise and the Heart—Muscle Maketh Man—The Danger of Stopping Athletics—Exercise that Rests. It is written in a direct matter-of-fact manner with an avoidance of medical terms, and a strong emphasis on the rational, all-round manner of living that is best calculated to bring a man to a ripe old age with little illness or consciousness of bodily weakness.

"One of the most readable books ever written on physical exercise."—Luther H. Gulick, M.D., Department of Child Hygiene, Russell Sage Foundation.

FARM DRAINAGE & IRRIGATION, by W. J. McGee. Sometimes it is necessary to spend money to get water on the land; sometimes to get it off. Mr. McGee has studied the question from both angles in his work for the Department of Agriculture and this book will contain his latest and fullest conclusions. Particular attention will be paid to the matter of sub-surface irrigation to which little heed has been given until lately.

FENCING, by Edward Breck. Dr. Breck was for many years one of the best-known amateur fencers in America and is acquainted with the best swordsmen of the present day, here and abroad. His book is a practical guide for those who wish to know the most approved practice in the use of the foil, duelling sword, or saber. Suggestions are given on training and condition, as well as on the finer points of the game.

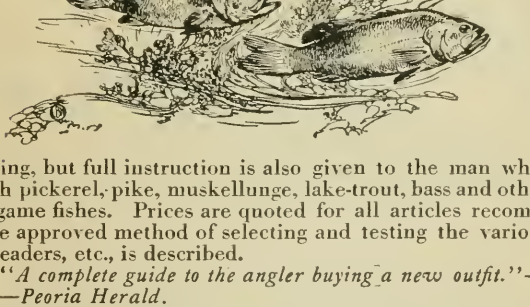
THE FINE ART OF FISHING, by Samuel G. Camp.

Combines the pleasure of catching fish with the gratification of following the sport in the most approved manner. The suggestions offered are helpful to beginner and expert anglers. The range of fish and fishing conditions covered is wide and includes such subjects as "Casting Fine and Far Off", "Strip-Casting for Bass", "Fishing for Mountain Trout" and "Autumn Fishing for Lake Trout". The book is pervaded with a spirit of love for the streamside and the out-doors generally which the genuine angler will appreciate. A companion book to "Fishing Kits and Equipment". The advice on outfitting so capably given in that book is supplemented in this later work by equally valuable information on how to use the equipment.

"Will encourage the beginner and give pleasure to the expert fisherman."—N. Y. Sun.

FISHING KITS AND EQUIPMENT by Samuel G. Camp.

A complete guide to the angler buying a new outfit. Every detail of the fishing kit of the freshwater angler is described, from rod-tip to creel, and clothing. Special emphasis is laid on outfitting for



fly fishing, but full instruction is also given to the man who wants to catch pickerel, pike, muskellunge, lake-trout, bass and other freshwater game fishes. Prices are quoted for all articles recommended and the approved method of selecting and testing the various rods, lines, leaders, etc., is described.

"A complete guide to the angler buying a new outfit."—
—Peoria Herald.

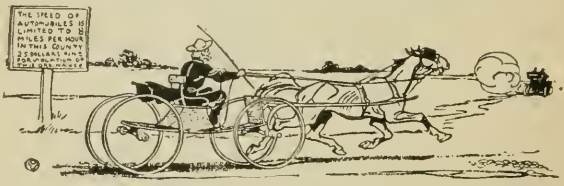
FISHING WITH FLOATING FLIES by Samuel G. Camp.

This is an art that is comparatively new in this country although English anglers have used the dry fly for generations. Mr. Camp has given the matter special study and is one of the few American anglers who really understands the matter from the selection of the outfit to the landing of the fish. His book takes up the process in that order, namely—How to Outfit for Dry Fly Fishing—How, Where, and When to Cast—The Selection and Use of Floating Flies—Dry Fly Fishing for Brook, Brown and Rainbow Trout—Hooking, Playing and Landing—Practical Hints on Dry Fly Fishing.

THE FOX TERRIER, by Williams Haynes. As in his other books on the terrier, Mr. Haynes takes up the origin and history of the breed, its types and standards, and the more exclusive representatives down to the present time. Training the Fox Terrier —His Care and Kenneling in Sickness and Health—and the Various Uses to Which He Can be Put—are among the phases handled.

THE GASOLINE MOTOR, by Harold Whiting Slauson. Deals with the practical problems of motor operation. The standpoint is that of the man who wishes to know how and why gasoline generates power and something about the various types. Describes in detail the different parts of motors and the faults to which they are liable. Also gives full directions as to repair and upkeep. Various chapters deal with Types of Motors—Valves—Bearings—Ignition — Carburetors — Lubrication — Fuel — Two Cycle Motors.

GUNSMITHING FOR THE AMATEUR, by Edward C. Crossman. Mr. Crossman, who is one of the best-known rifle experts in the country, takes up in detail the care and repair of the gun. He discusses such questions as The Present Development of the Gun—Tools for the Amateur—Rifle Barrels—Smooth Bore Barrels—Rifle Actions—Pistol and Gun Actions—Refinishing and Processing—The Stock, Sights and Aids to Accuracy.



THE HORSE—Its Breeding, Care and Use, by David Buffum. Mr. Buffum takes up the common, every-day problems of the ordinary horse-user, such as feeding, shoeing, simple home remedies, breaking and the cure for various equine vices. An important chapter is that tracing the influx of Arabian blood into the English and American horses and its value and limitations. Chapters are included on draft-horses, carriage horses, and the development of the two-minute trotter. It is distinctly a sensible book for the sensible man who wishes to know how he can improve his horses and his horsemanship at the same time.

INTENSIVE FARMING, by L. C. Corbett. A discussion of the meaning, method and value of intensive methods in agriculture. This book is designed for the convenience of practical farmers who find themselves under the necessity of making a living out of high-priced land.

LAYING OUT THE FARM FOR PROFIT, by L. G. Dodge. One of the farmers' great problems is to put every acre of his land to the best possible use. This book discusses the methods of obtaining this result. The author is an investigator for the Department of Agriculture and has given particular attention to this subject.

THE MOTOR BOAT--Its Selection, Care and Use, by H. W. Slauson. The intending purchaser is advised as to the type of motor boat best suited to his particular needs and how to keep it in running condition after purchased. The Chapter headings are: Kinds and Uses of Motor Boats--When the Motor Balks—Speeding of the Motor Boat—Getting More Power from a New Motor —How to Install a Marine Power Plant—Accessories—Covers, Canopies and Tops—Camping and Cruising—The Boathouse.

NAVIGATION FOR THE AMATEUR, by Capt. E. T. Morton. A short treatise on the simpler methods of finding position at sea by the observation of the sun's altitude and the use of the sextant and chronometer. It is arranged especially for yachtsmen and amateurs who wish to know the simpler formulae for the necessary navigation involved in taking a boat anywhere off shore. Illustrated with drawings. Chapter headings: Fundamental Terms—Time—The Sumner Line—The Day's Work, Equal Altitude, and Ex-Meridian Sights—Hints on Taking Observations.

OUTDOOR PHOTOGRAPHY, by Julian A. Dimock. A solution of all the problems in camera work out-of-doors. The various subjects dealt with are The Camera—Lens and Plates—Light and Exposure — Development — Prints and Printing — Composition — Landscapes — Figure Work — Speed Photography — The Leaping Tarpon—Sea Pictures—In the Good Old Winter Time—Wild Life. The purpose of the book is to serve as a guide not only for the man or woman who has just taken up the use of the camera, but also for those who have progressed far enough to know some of the problems that confront them.

OUTDOOR SIGNALLING, by Elbert Wells.

Mr. Wells has perfected a method of signalling by means of wig-wag. light, smoke, or whistle which is as simple as it is effective. The fundamental principle can be learnt in ten minutes and its application is far easier than that of any other code now in use. It permits also the use of cipher and can be adapted to almost any imaginable conditions of weather, light, or topography.

"I find it to be the simplest and most practical book on signalling published."—Frank H. Schrenk, Director of Camp Belgrade.

"One of the finest things of the kind I have ever seen. I believe my seven year old boy can learn to use this system, and I know that we will find it very useful here in our Boy Scout work."—Lyman G. Haskell, Physical Director, Y. M. C. A., Jacksonville, Fla.

PACKING AND PORTAGING, by Dillon Wallace.

Mr. Wallace has brought together in one volume all the valuable information on the different ways of making and carrying the different kinds of packs. The ground covered ranges from man-packing to horse-packing, from the use of the tump line to throwing the diamond hitch. The various chapters deal with Packing and the Outfit—The Canoe and Its Equipment—Camp Equipment for the Canoe Trip—Personal Equipment—Food—The Portage—Travel with Saddle and Pack Animals—Saddle and Pack Equipment—Adjusting the Pack—Some Practical Hitches—Traveling Without a Pack Horse—Afoot in Summer—With Snowshoes and Toboggan—With Dogs and Komatik.

PRACTICAL POULTRY KEEPING, by R. B. Sando.

In effect a comprehensive manual for the instruction of the man who desires to begin poultry raising on a large or small scale and to avoid the ordinary mistakes to which the beginner is prone. All the statements are based on the author's own experience, and special care has been taken to avoid sensationalism and exaggeration. The general contents are Poultry Keeping and Keepers—Housing and Yarding—Fixtures and Equipment—Choosing and Buying Stock—Foods and Feeding—Hatching and Raising Chicks—Poultry Diseases. Illustrated.

PROFITABLE BREEDS OF POULTRY, by Arthur S. Wheeler. Mr. Wheeler discusses from personal experience the best-known general purpose breeds. Advice is given from the standpoint of the man who desires results in eggs and stock rather than in specimens for exhibition. In addition to a careful analysis of stock—good and bad—and some conclusions regarding housing and management, the author writes in detail regarding Plymouth Rocks, Wyandottes, Orpingtons, Rhode Island Reds, Mediterraneans and the Cornish.

"This is an invaluable book for those who would make a success in the poultry business."—Grand Rapids, (Mich.) Herald.

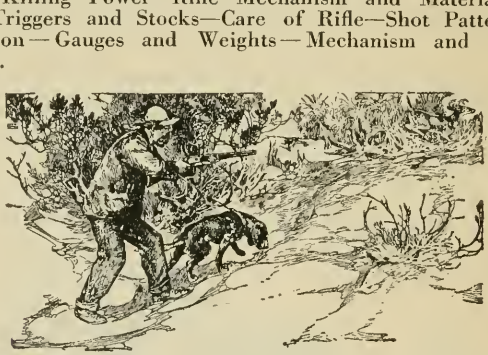
RIFLES AND RIFLE SHOOTING, by Charles Askins. A practical manual describing various makes and mechanisms, in addition to discussing in detail the range and limitations in the use of the rifle. Among other things, the chapters deal with The Development of the American Breech-Loading Rifle—Single Shot Rifle—Lever-Action Repeater—Pump-Action Repeater and

Military Bolt-Action—Double Rifle—Rifle and Shotgun—Self-Loading Rifle—Rifle Cartridges, Miniature and Gallery—Small Game—Match-Rifle Cartridges and Their Manipulation—High Power, Small Bore Hunting Cartridges—Big Bore, High Power Cartridges—Trajectory, Accuracy, and Power of Hunting Cartridges—Weight of Rifle and Recoil—Stocks and Triggers—Rifle Sights—Positions for Rifle Shooting—Outdoor Target Shooting,—Quick Firing and Running Shots—Fancy Snap and Wingshooting—Two-Hundred Yard Sharpshooting.

SCOTTISH AND IRISH TERRIERS, by Williams Haynes. This is a companion book to "The Airedale", and deals with the history and development of both breeds. For the owner of the dog, valuable information is given as to the use of the terriers, their treatment in health, their treatment when sick, the principles of dog breeding, and dog shows and rules.

"The happy owner of a terrier for the first time could not go wrong if he follows Mr. Haynes' advice."—Brooklyn Standard Union.

SPORTING FIREARMS, by Horace Kephart. This book is the result of painstaking tests and experiments. Practically nothing is taken for granted. Part I deals with the rifle, and Part II with the shotgun. The man seeking guidance in the selection and use of small firearms, as well as the advanced student of the subject, will receive an unusual amount of assistance from this work. The chapter headings are: Rifles and Ammunition—The Flight of Bullets—Killing Power—Rifle Mechanism and Materials—Rifle Sights—Triggers and Stocks—Care of Rifle—Shot Patterns and Penetration—Gauges and Weights—Mechanism and Build of Shotguns.



TRACKS AND TRACKING, by Josef Brunner. After twenty years of patient study and practical experience, Mr. Brunner can, from his intimate knowledge, speak with authority on this subject. "Tracks and Tracking" shows how to follow intelligently even the most intricate animal or bird tracks. It teaches how to interpret tracks of wild game and decipher the many telltale signs of the chase that would otherwise pass unnoticed. It proves how it is possible to tell from the footprints the name, sex, speed, direction, whether and how wounded, and many other things about wild animals and birds. All material has been gathered first hand; the drawings and half-tones from photographs form an important part of the work, as the author has made faithful pictures of the tracks and signs of the game followed. The list is: The White-Tailed or Virginia Deer—The Fan-Tailed Deer—The Mule-Deer—The Wapiti or Elk—The Moose—The Mountain Sheep—The Antelope—The Bear—The Cougar—The Lynx—The Domestic Cat—The Wolf—The Coyote—The Fox—The Jack Rabbit—The Varying Hare—The Cottontail Rabbit—The Squirrel—The Marten and the Black-Footed Ferret—The Otter—The Mink—The Ermine—The Beaver—The Badger—The Procupine—The Skunk—Feathered Game—Upland Birds—Waterfowl—Predatory Birds. This book is invaluable to the novice as well as the experienced hunter.

"This book studied carefully, will enable the reader to become as well versed in tracking lore as he could by years of actual experience."—Lewiston Journal.

WING AND TRAP-SHOOTING, by Charles Askins. The only practical manual in existance dealing with the modern gun. It contains a full discussion of the various methods, such as snap-shooting, swing and half-swing, discusses the flight of birds with reference to the gunner's problem of lead and range and makes special application of the various points to the different birds commonly shot in this country. A chapter is included on trap shooting and the book closes with a forceful and common-sense presentation of the etiquette of the field.

"It is difficult to understand how anyone who takes a delight in hunting can afford to be without this valuable book."—Chamber of Commerce Bulletin, Portland, Ore.

"This book will prove an invaluable manual to the true sportsman, whether he be a tyro or expert."—Book News Monthly.

"Its closing chapter on field etiquette deserves careful reading."—N. Y. Times.

THE YACHTSMAN'S HANDBOOK, by Herbert L. Stone. The author and compiler of this work is the editor of "Yachting". He treats in simple language of the many problems confronting the amateur sailor and motorboatman. Handling ground tackle, handling lines, taking soundings, the use of the lead line, care and use of sails, yachting etiquette, are all given careful attention. Some light is thrown upon the operation of the gasoline motor, and suggestions are made for the avoidance of engine troubles.